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The Heating and Ventilating Magazine

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NOVEMBER 1920

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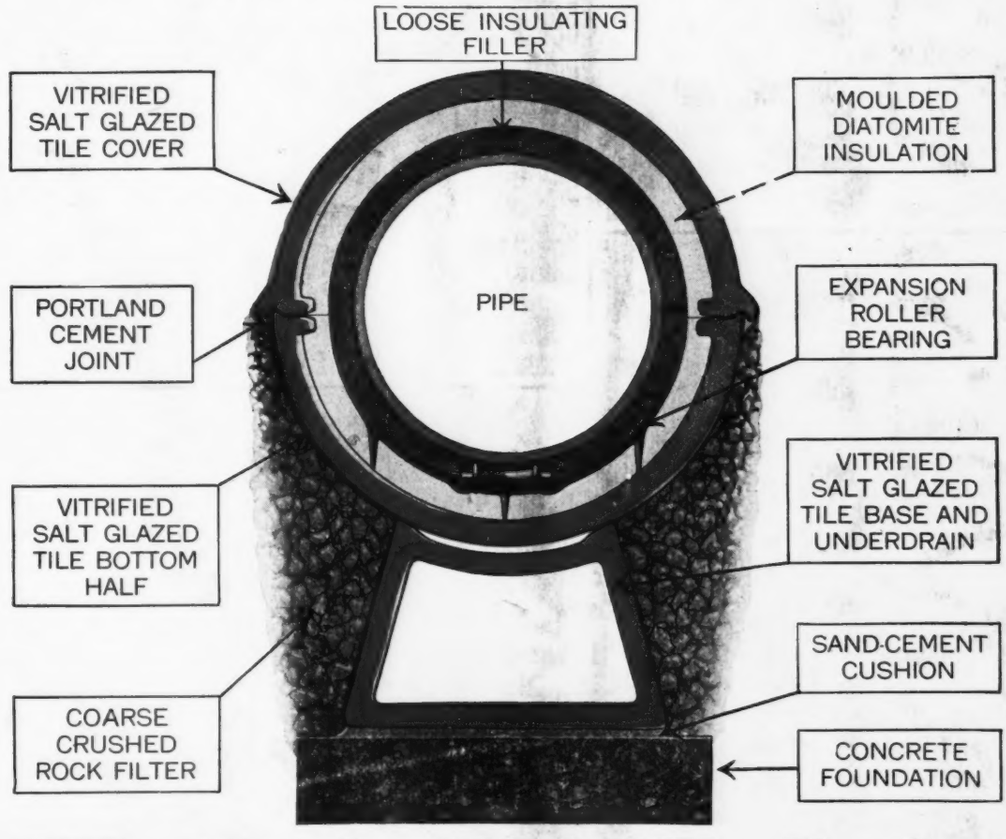
New York Office, 1123 Broadway

"RIC-WIL" SECTIONAL VITRIFIED TILE CONDUIT
FOR INSULATING STEAM OR HOT WATER IPES



THE RIC-WIL COMPANY, Cleveland
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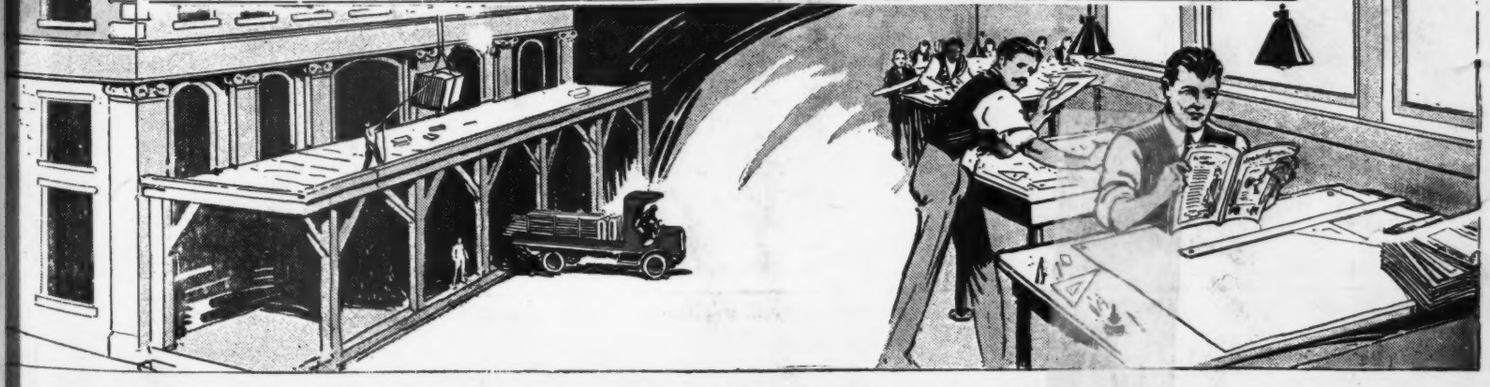
AGENTS IN PRINCIPAL CITIES



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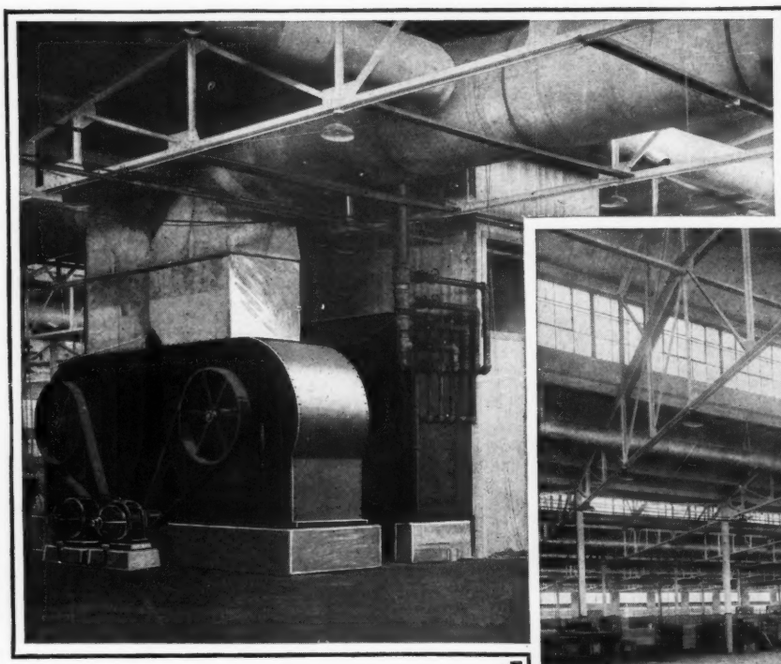
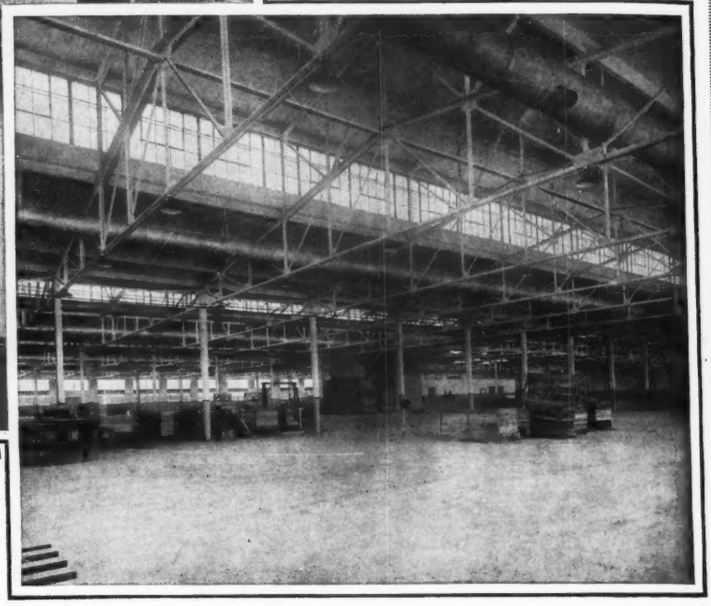
CLARAGE
KALAMAZOO



Architects and Engineers:
Billingham & Cobb, Kalamazoo, Mich.

Kalamazoo Sheet Metal Mfg. Co. erected and installed the Sheet Metal Piping System.



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A MONTHLY JOURNAL OF ENGINEERING PROGRESS
NOVEMBER, 1920

HEATING SYSTEM FOR THE NEW SING SING PRISON

Interesting Features of a Design in Which Unusual Requirements Were Met

BY GEORGE B. NICHOLS,
Formerly Chief Engineer, Department of Architecture, State of New York

FOR the last ten years, the public has had before it the matter of the housing conditions at Sing Sing Prison. The main cell house, (about which the greatest agitation existed), consisting of a massive stone structure, with interior walls also of stone, without any sanitary conveniences, has long been a menace to the unfortunate person forced to live in these closely-confined quarters. This building was erected about one hundred years ago, when the methods of housing prisoners were radically different from those of the present time.

At that time, a prison was simply a place to ostracize the unfortunate who had committed some form of crime against society; the sole idea was to make an example of him so that his crime would not be repeated. With the modern ideas of furnishing the prisoner with light and airy cells, provided with proper sanitary equipment, thereby not impairing his health but simply confining him to the prison, and furnishing him with higher moral and intellectual ideas, it became imperative to abandon the old prison buildings and select an entirely new site.

The legislature, therefore, took up the problem about four years ago, at which time appropriations were made to provide new buildings, the same to be located on property adjoining the prison, and on very much higher land to the east of the New York Central tracks.

This site is one of the most picturesque that could be selected, as it overlooks the Hudson at a very high elevation looking towards the Palisades on the opposite side of the river,

As the buildings required considerable ventilation, it was decided that a vacuum heating system should be installed. The steam mains are to be carried underground from the power house in a walking tunnel, through the present prison yard, across the existing bridge over the New York Central tracks, and through a walking tunnel to the Clinic Building. From the Clinic Building, all of the mains will be carried in underground sectional tile conduit.

The total amount of radiation for the proposed group will be approximately 65,000 equivalent square feet of direct radiation, which is to be supplied by a 12-in. low-pressure steam main leading from the power house. A 5-in. medium-pressure main will also lead from the power house, for supplying high-pressure cooking and sterilizers for the group. A cross connection will be made in the group between the medium-pressure and the low-pressure, for supplying any make-up steam that may be required.

DESCRIPTION OF BUILDINGS.

A description of the buildings in general is as follows:

The Clinic Building will consist of a three-story structure with medical offices for the study and examination of prisoners, together with laboratories, thus being a truly psychopathic building. Provisions will also be made for lecture rooms, museums and libraries on the second floor, together with dormitories on the third floor, for prisoners under observation.

At the rear of this building, there is now under contract an outside Cell Block Building, (See Fig. 2) where prisoners can also be housed, who are under observation. This building, with its extension, forms a medical center for the proper study of prisoners, An extended view is obtained for almost ten miles up and down the Hudson, and a prisoner cannot help being affected by this wide expanse of nature.

PRISON TO SERVE AS CLASSIFICATION CENTER.

The new prison is to be used as a classification center, where all prisoners of the State will be sent, upon their committal, for careful study, both in regard to their capability for work and their physical condition. This process of observation has long been considered necessary, as a large number of these people are mental defectives or feeble minded, and should be seggregated into groups according to their mentality. From this prison, they will be distributed to the other prisons throughout the State. Part of the prisoners, however, will be permanently retained for the proper operation of the prison and to carry on some of the industries which will be established at the old prison site.

It was fortunate in the selection of a new site that such an admirable piece of property adjoining the prison was owned by the State, as it was possible to utilize the power

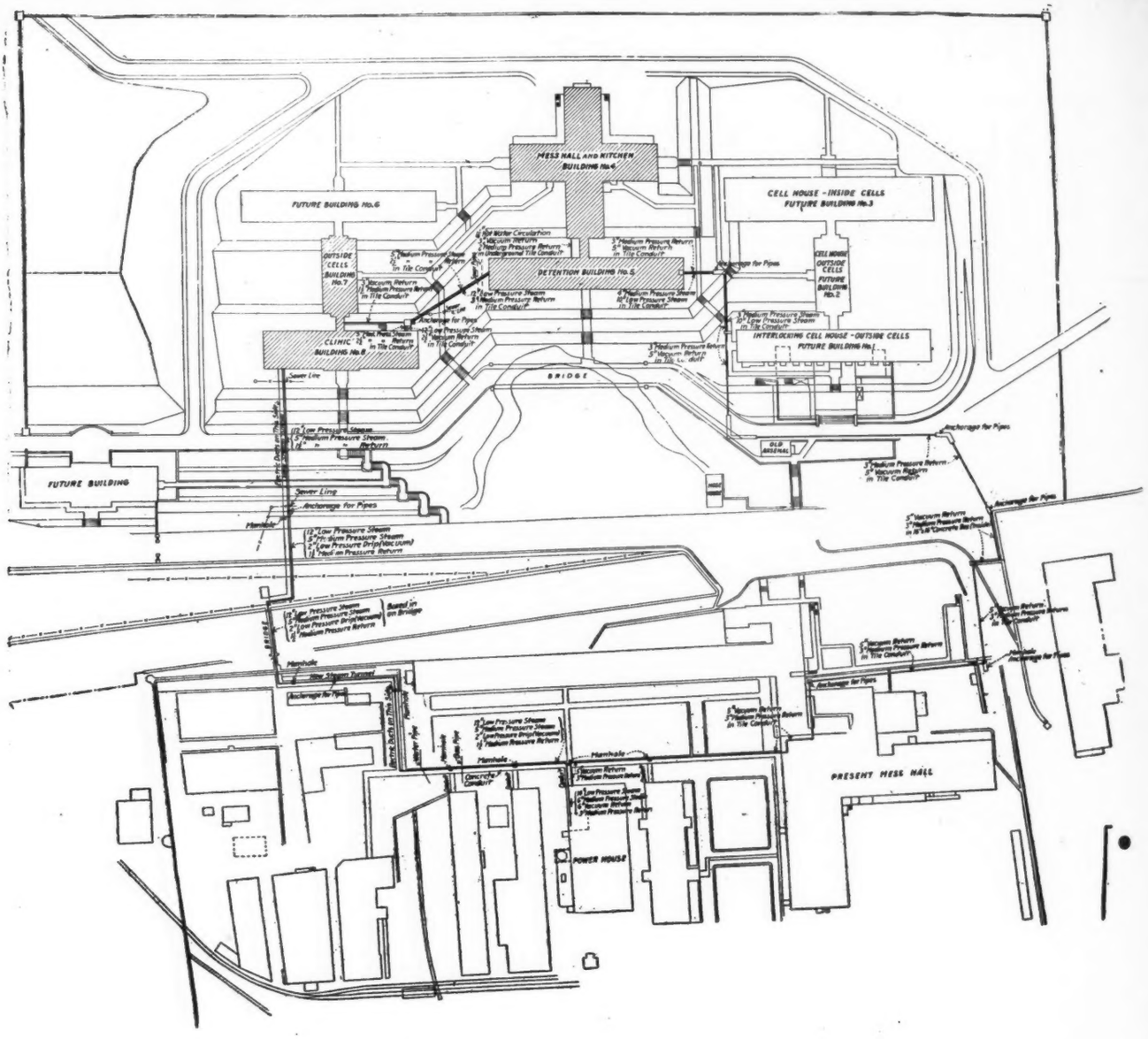


FIG. 1—BLOCK PLAN, NEW SING SING PRISON BUILDINGS.

plant at the old prison site, (which plant was erected about seven years ago), together with water supply, sewage system, etc. Already, there is under contract a Detention Building, Mess Hall and Kitchen, Clinic Building and Outside Cell Block. A general arrangement of these buildings is shown on the block plan, (Fig. 1). together with proper housing for same while under observation.

The main psychopathic portion of this building is to be heated by direct radiation only. The outside Cell Block in the rear, however, is to be heated by forced air taken in at the ground level, passing through a fan in the basement main trunk ducts, thence through vertical ducts, connecting into the horizontal trunk ducts at each cell level. The distributing ducts have openings over the doors to each cell, thereby making it possible to supply proper ventilation to each cell, in addition to an outside window in each cell.

Between each pair of cells at the lower tier, there is a register leading into a shaft and the upper portion of these shafts in the attic leads into the main trunk ducts, which in turn connect into a plenum chamber. In the plenum chamber is an exhaust fan discharging air above the roof. The space in the center of the building between the galleries in front of the cells is open.

It can, therefore, be seen that the cells will be supplied with the proper amount of air, which can be regulated by individual dampers, and the foul air will circulate through the door, dropping to the lower level and thence be exhausted to the roof.

Arrangements have also been made whereby the plenum chamber can exhaust directly from the center portion of the building at the upper level. This can be used in mild and warm weather.

Each cell is to be furnished with an individual lavatory and water-closet, equipped with push button faucets and flushometers, located in the pipe shaft. The vertical fronts of the pipe shafts are made of steel plate and can be removed, thereby making it possible to repair any plumbing pipes at a future date.

In the basement of the Cell Building is a large shower room for bathing purposes, with shower heads around the sides of the room. On account of the steam and odors that may accumulate in this room, due to the large number of people bathing at one time, a separate exhaust fan was installed, exhausting air from the upper portion of this room.

The Detention Building (Fig. 7) will consist of four stories and basement, the basement being used for two

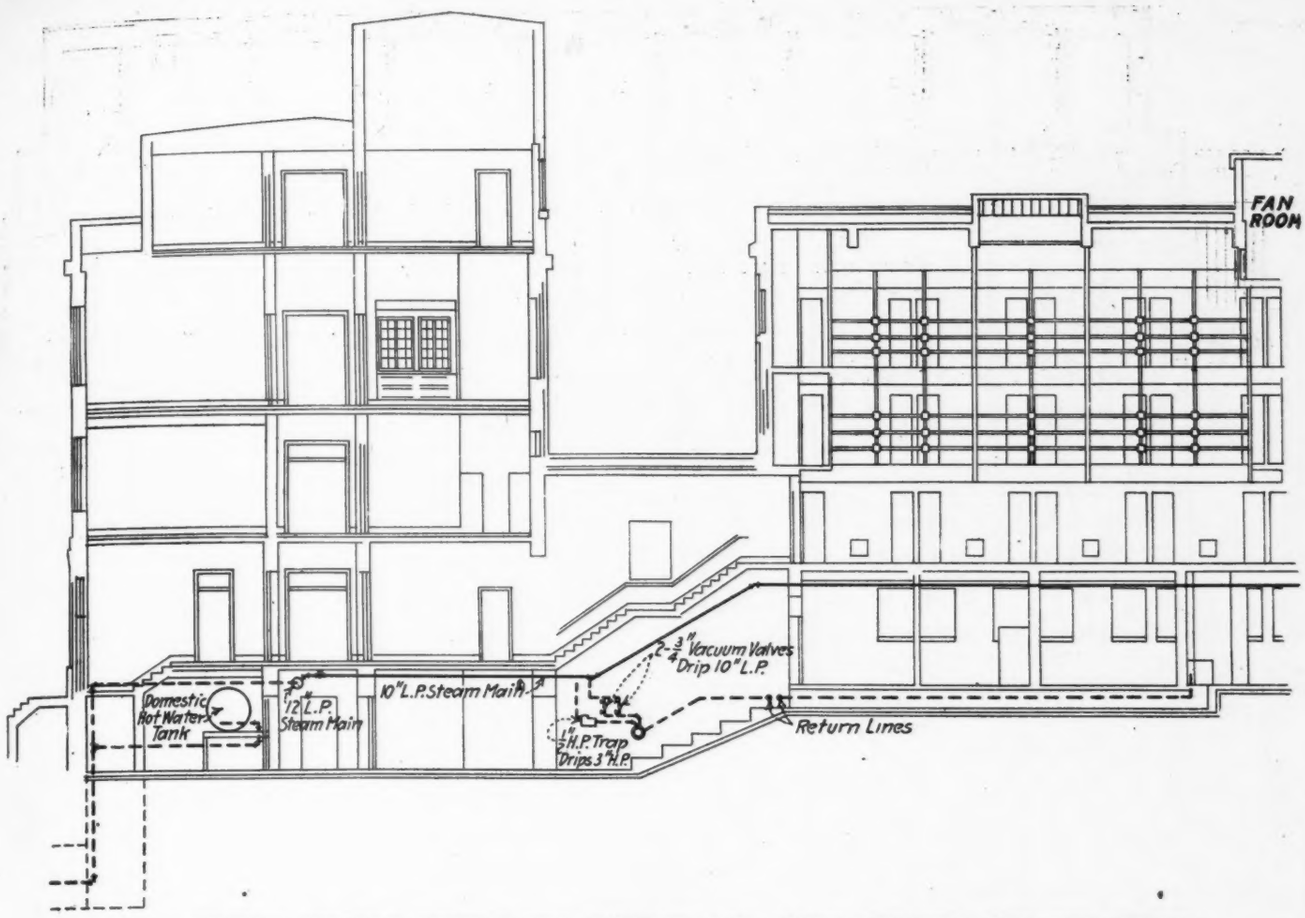

FAN ROOM
2-3/4" Vacuum Valves Drip 10" L.P.
Domestic Hot Water Tank
12" L.P. Steam Main
10" L.P. Steam Main
1" H.P. Trap Drips 3" H.P.
Return Lines

FIG. 2—SECTION THROUGH OUTSIDE CELL BUILDING AND CLINIC BUILDING, SING SING PRISON.

The floors are practically alike and consist of two rows of outside cells, each with a separate window to provide air and light. In this building, however, the center corridor between cells is to be floored over clear across, thereby requiring a different form of ventilation from that of the Cell Building connected to the Clinic Building. In this building, the air is forced to the cells, in a manner similar to that above described. In the exhaust system, however, it was necessary to provide registers between certain cells in the pipe shaft, at the floor level at each tier, a shaft being assigned for connecting to one floor only and to the horizontal duct in the attic.

The fresh air fans in the basement consist of two rigs, each supplying one-half the building. One rig, however, will take care of the exhaust for the entire building in the attic.

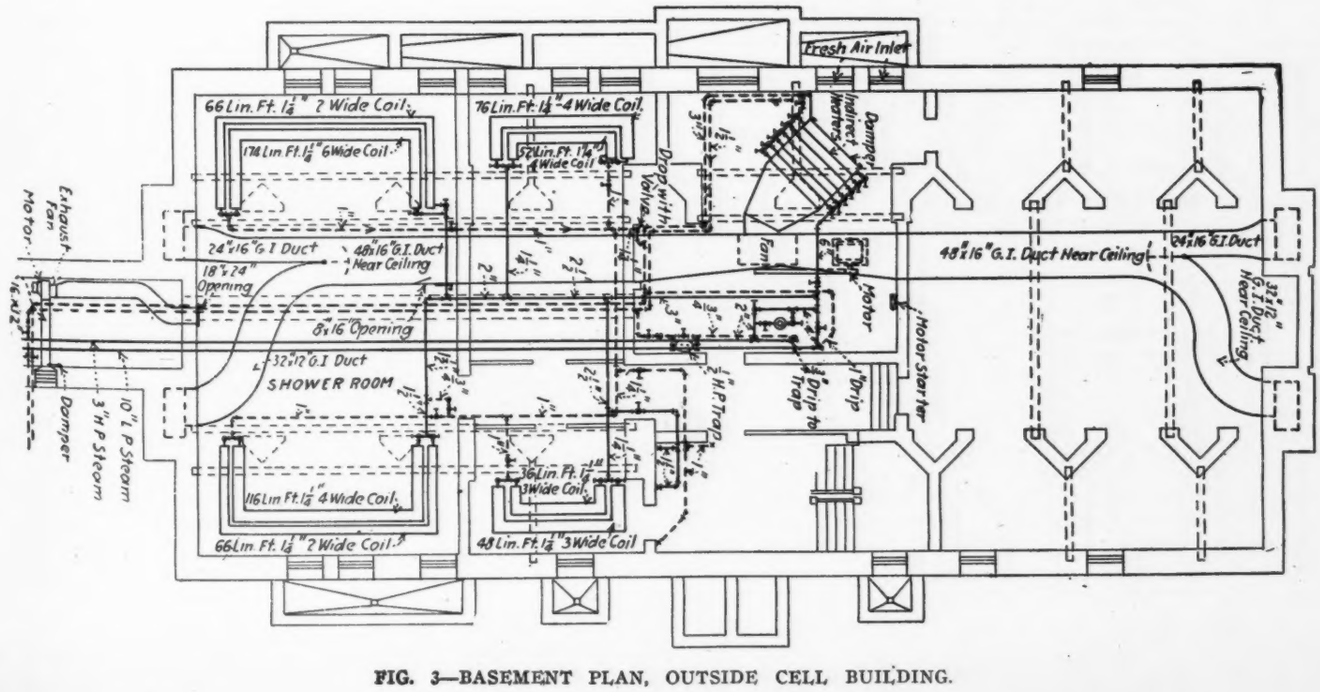


FIG. 3—BASEMENT PLAN, OUTSIDE CELL BUILDING.

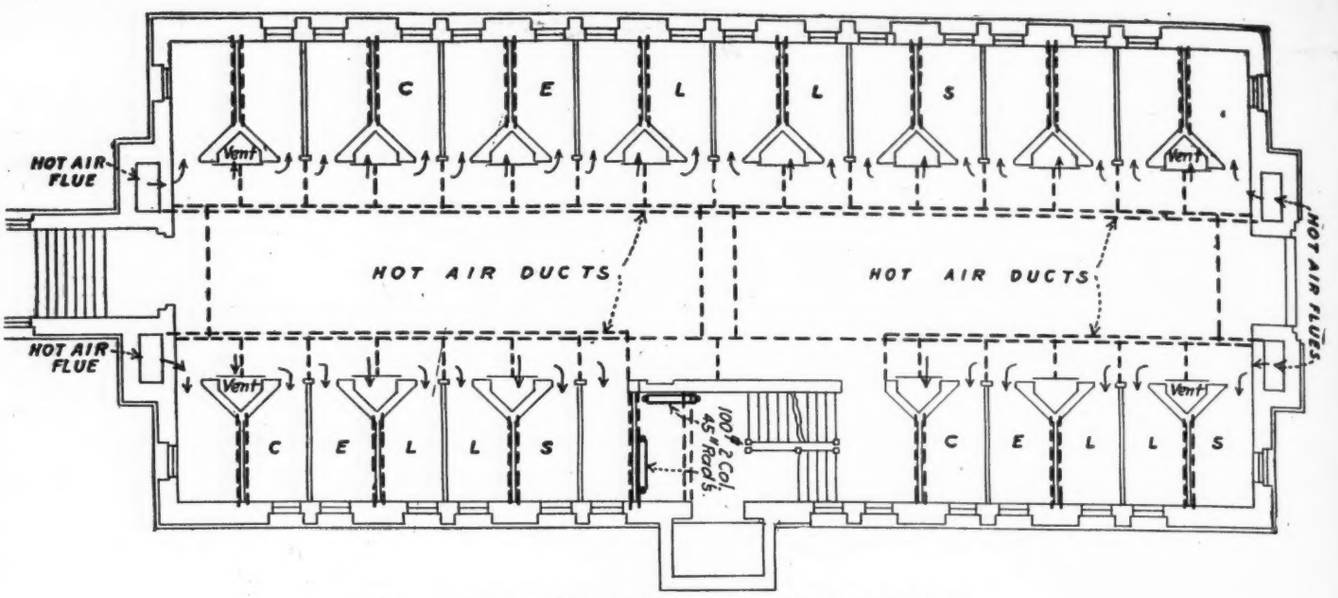


FIG. 4—FIRST FLOOR PLAN, OUTSIDE CELL BUILDING.

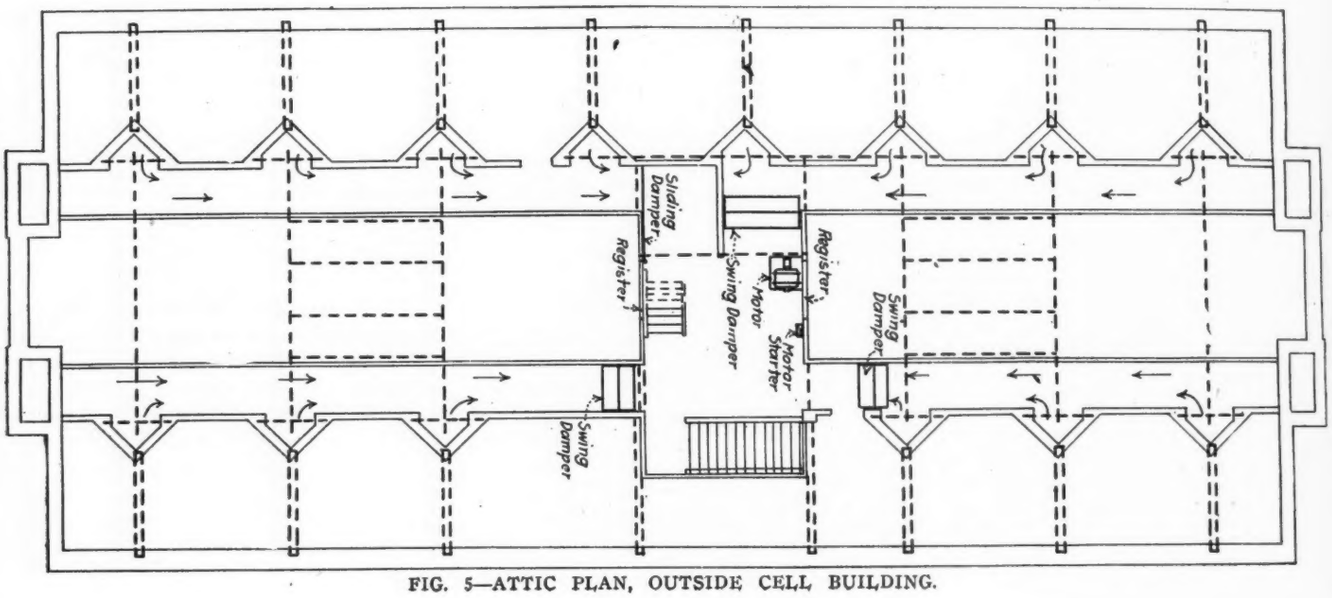


FIG. 5—ATTIC PLAN, OUTSIDE CELL BUILDING.

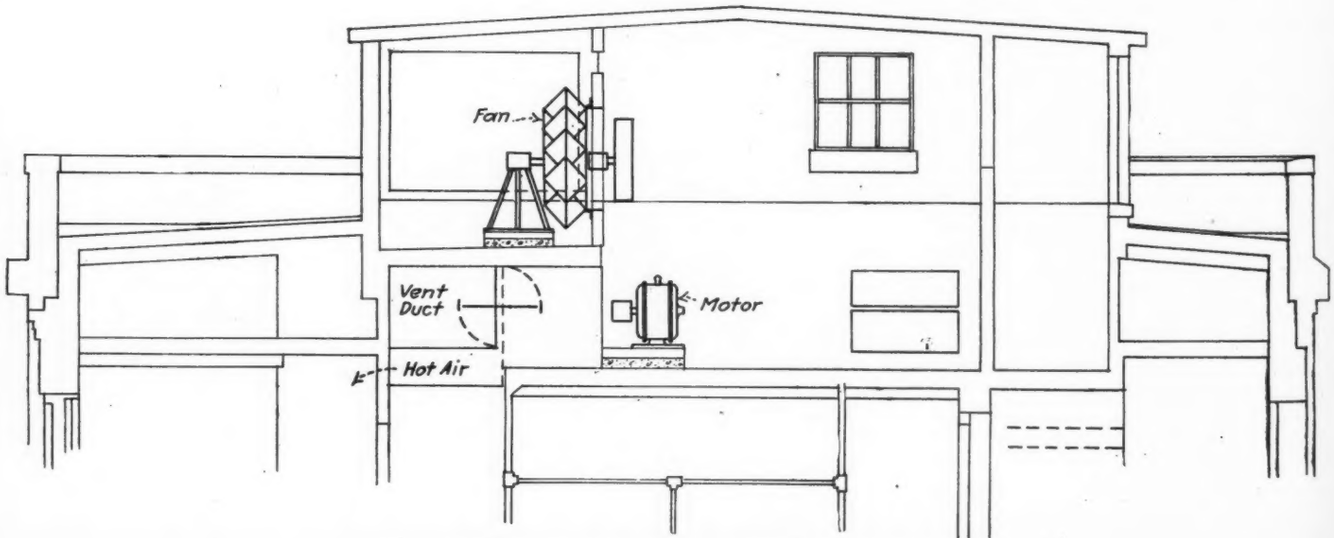


FIG. 6—SECTION OF FAN ROOM, OUTSIDE CELL BUILDING.

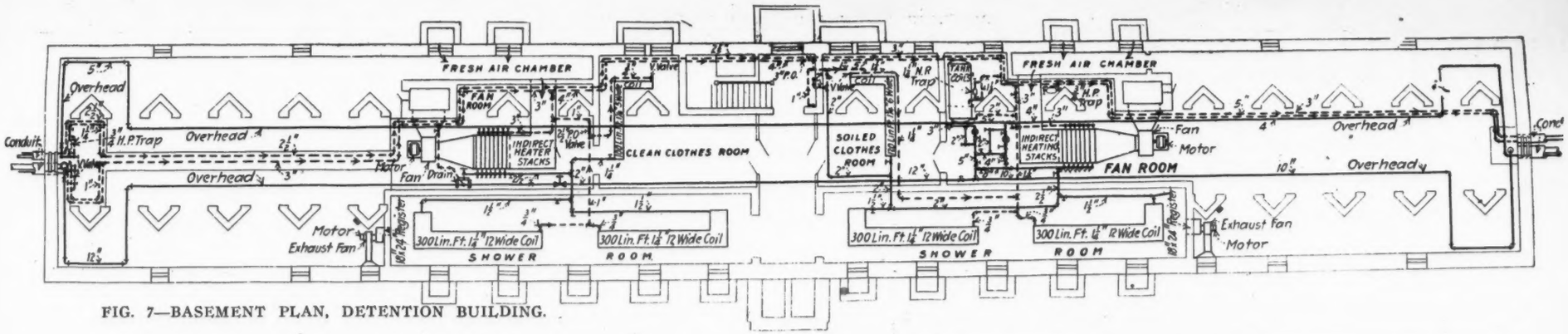


FIG. 7—BASEMENT PLAN, DETENTION BUILDING.

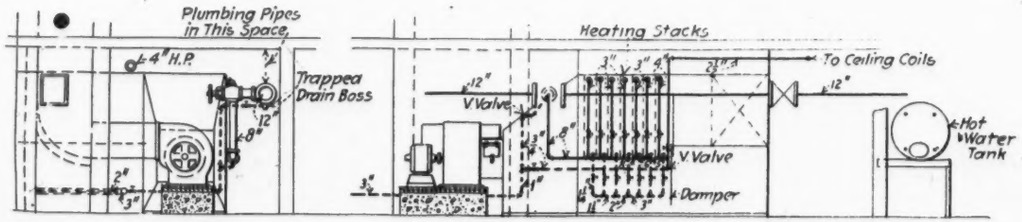


FIG. 8—ELEVATION OF FAN AND HEATERS, DETENTION BUILDING.

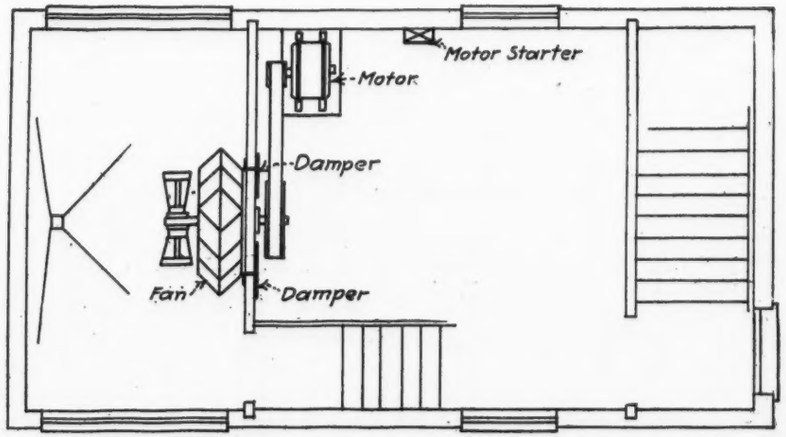


FIG. 9—PLAN OF FAN ROOM, OUTSIDE CELL BUILDING.

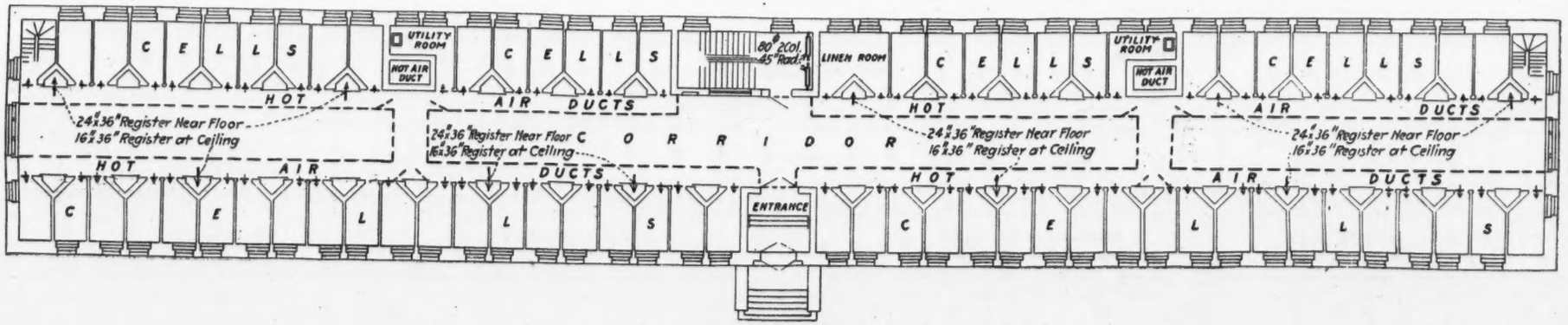


FIG. 10—FIRST FLOOR PLAN, DETENTION BUILDING.

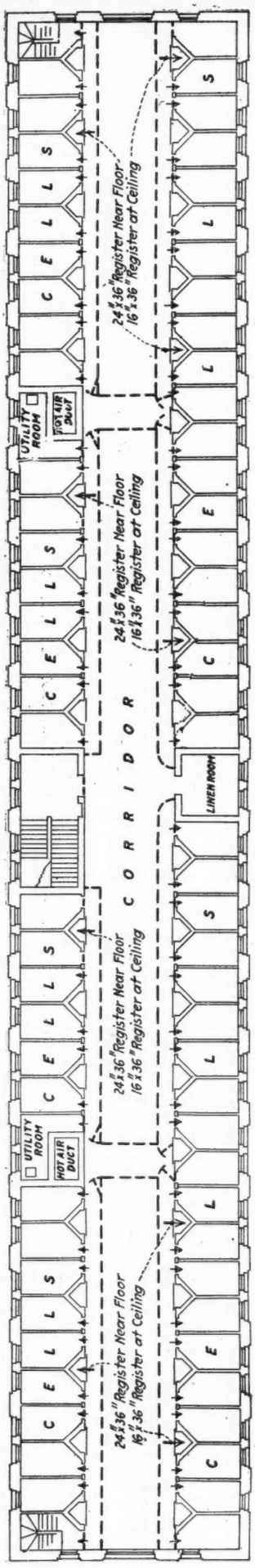


FIG. 11—FOURTH FLOOR PLAN, DETENTION BUILDING.

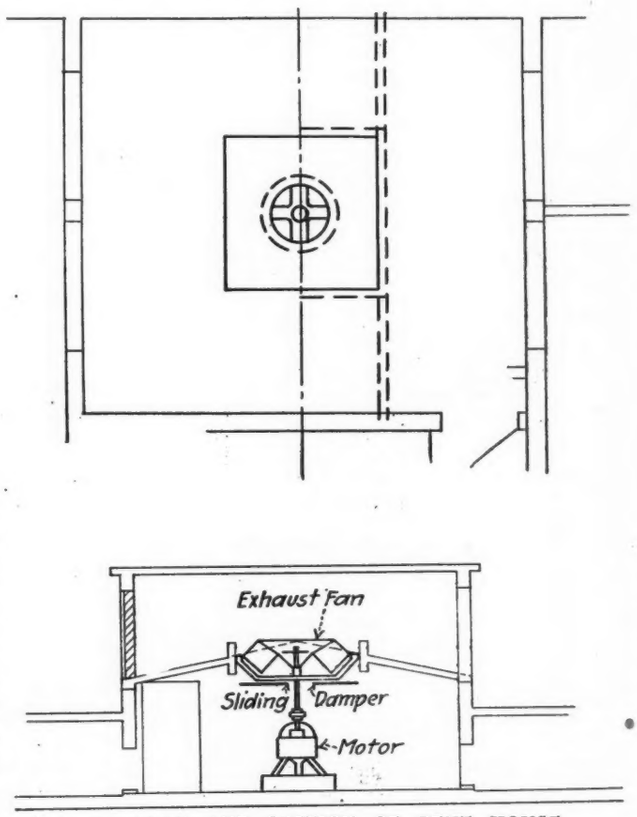


FIG. 12—PLAN AND SECTION OF PENT HOUSE, DETENTION BUILDING.

The Mess Hall and Kitchen will consist of a one-story and basement building, in which will be three large mess halls, with central dish-washing department, with four mechanical dish washers, and a main kitchen. Connected with the kitchen will be two refrigerating rooms, the refrigerating plant being in the basement, where, also, there will be three additional refrigerating rooms. The refrigerating plant will be of ample size to make sufficient ice for use in all parts of the institution.

The heating of this building will be by direct radiation.

All of the above buildings are now well under way and upon their completion, the old Sing Sing Cell Block will be abandoned and the prisoners transferred to the new buildings, thereby blotting out of existence a menace to society; a building which has housed unfortunates for the last one hundred years, in an inhuman and unsanitary way. The cells in this old building are a few inches higher than a man, 6 ft. 3 in. long and about 3 ft. 8 in. wide with generally two occupants in each cell, who were kept locked in, except for meals, from Saturday night until Monday morning.

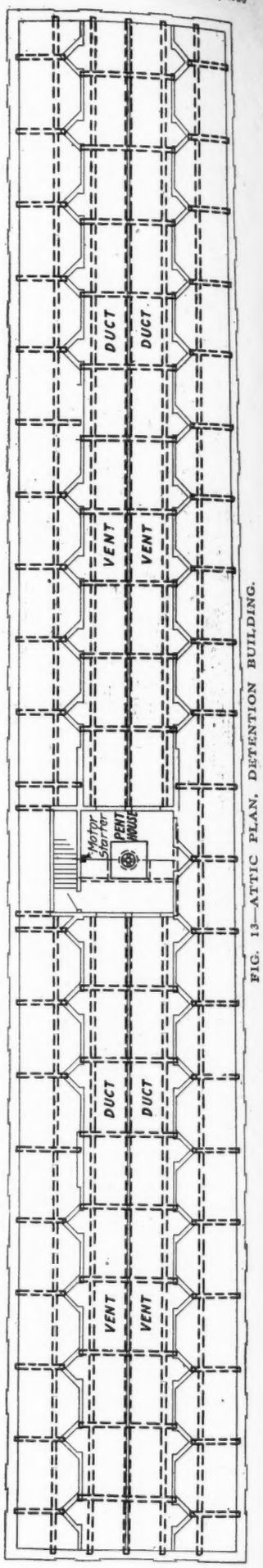


FIG. 13—ATTIC PLAN, DETENTION BUILDING.

A USEFUL FORM FOR THE TESTING AND INSPECTION OF HEATING PLANTS

THE following form will appeal to those experienced in the design of heating plants and who, through extensive observations of operating conditions in a very large number of plants, are convinced that there is room for vast improvement therein.

This is an interesting field for the engineer, that of the trouble hunter, and the results are, except in the case of small plants, financially renumerative, both to the owner and engineer. Equally well do they improve the lot of the engineer in charge, however averse thereto he may be at the outset.

In reference to wastes, the form with its blanks to be filled in at the plant, is instructive in pointing out the usual sources of errors and such wastes which may be all or in part prevented. The greatest of these is combustion and in lesser degree, the engine and transmission.

Air leakage in boiler settings must be prevented, feed water properly treated and heated. Coal wastes may be prominent, either due to an unskilled fireman or present-day conditions where the coal obtainable is not the most economical for the particular conditions. In the past three years the cost of fuel has doubled and it seems altogether likely that the cost will go still higher. The fuel problem has alwayas been a very important one but except for the War period, never so important as at this time.

Often the difficulties are due to improper design of grates, excess air, too thick or too thin a fuel bed, improper design of grates, insufficient flue area or height of chimney. In one case a chimney was increased 100 ft. in height with a consequent fuel saving of four times the cost of the chimney extension.

What draft will carry the load and burn the least coal? Is the air admitted to the furnace, either above or below the fire, more than is necessary? Is the smoke as made due to lack of air, mixture or temperature? Is the water evaporated low in amount and is this due to the boiler, furnace, coal or fireman? These are things to be looked into and remedied.

Steam wastes, usually more numerous in use than in production, are still so evident in some plants as to cause but little comment. Exhaust steam may frequently be observed wasted to the atmosphere when it might well be used instead of live steam for heating, drying or other purposes, and at a considerable saving. Steam piping should be designed to prevent excess condensation and the plant should generally be inspected for leaks at steam traps, engine pistons, blow-off and other valves.

Water wastes are not so important, though in the case of large installations with water obtained from city mains, this waste may be considerable, and even more so in refrigerating plants. Oil from exhaust steam can be effectively removed and the steam saved, likewise provision should be made for the saving of water from condensers.

The form may be supplemented by coal, water and oil analyses. Coal specifications and log sheets may be drawn up and a report made at yearly intervals. The results to the owner are a decrease in cost of plant operation and a much more efficient and reliable service, and these at a cost for engineering services which are small in comparison with the savings made.

DEPARTMENT OF TESTING AND INSPECTION
HEATING PLANT AND BUILDINGS

PLANT DATE Contract No. CLASS A
.....

ADDRESS RECORD

Owner .....
Owner's address.....Street.....City.....State
Plant address.....Street.....City.....State

BOILER PLANT

Boilers; No.....Type.....Working Pressure.....
Square feet heating surface.....Each.....Total
Square feet grate surface.....Each.....
Horse power.....Each.....Total
Hand fired.....or Stokers.....
Feed-water heater, make.....Type.....Size.....

DRAFT APPARATUS

Chimney, kind.....Diam.....Height.....
Draft, natural.....Forced .....Induced.....
Damper regulator.....Control on Draft Fan.....
.....
.....

FUEL

Kind of coal.....Grade and Size.....
Coal handled how.....Storage Space .....
Coal consumed per day.....Month.....Year .....
Price per ton on cars....Cost of cartage....Cost per year....
Analysis and calorific value.....
Amount of ash handled.....Cost of ash removal.....
Ash hoist..... Coal conveyor.....

SERVICE

SUMMER-WINTER

Superintendent .....Engineers.....Assts.....
Number of Firemen.....Asst. Firemen..... Coal Passers....
Number of Shifts.....Length .....
Hours plant runs per day...Days per week...Wks. per year...
Engineering service of building.....
Electricians.....Steam fitters, etc.....

STEAM PLANT OPERATION

Provision for weighing coal, permanent.....For test.....
Provision for weighing ash, permanent.....For test.....
Water meters or weighers, permanent.....For test.....
Other test or recording devices, permanent.....For test.....
Peak load, H. P.....Time of Occurrence.....Duration....
Boiler pressure, high.....Low.....Variation.....
Recording steam gage.....Recording F. W. Thermometer....
Temperature feed water, before heated...After...Increase...
General routine of operation.....
At what hours and for how long does steam exhaust to atmosphere in (say).....January.....April.....July .....October.
Expenditure—What items are chargeable to plant operation? .....
(*a*) Cylinder .....Engine .....
(Consumption in gallons, if possible).
Boiler Compound.....Kind.....Price.....Consumption.....
Waste .....Packing.....
Repairs made by outside labor.....
Total cost for year.....

ENGINE PLANT

Engines, number.....Type.....Make.....
H. P. each.....Total.....
Working pressure.....Back pressure.....
Piston diam.....
Piston stroke.....Belted.....
Non-condensing .....Condensing.....
What is driven.....

Hours run per days, from.....to.....Total.....
.....
.....

GENERATOR PLANT

Generators, number.....Make.....Type.....
Size each.....Total K. W. (or K. V. A.).....
Direct connected.....Belted.....
D. C. or A. C.....Voltage primary.....secondary....
Hours run per day, from.....to.....Total.....
.....
.....

ELECTRIC PLANT OPERATION

Steam engine indicator.....Reducing motion.....
Indicator piping in place.....Three-way-cock for .....
Electric meters, indicating.....Recording.....
Electric meters, main feeders.....Sub-feeders .....
Current generated in K. W. hours per month for each month for a year: (*a*) Lighting.....(*b*) Power.....
Hourly readings of current for a typical week day in (*a*) Summer.....(*b*) Winter.....

STORES AND REPAIRS

Amount expended on oil.

PUMPS

Number Feed Pumps.....Size....Capacity....Kind....
Number Vacuum Pumps .....Size....Capacity....Kind....
Number Water Pumps .....Size....Capacity....Kind....
Number Elevator Pumps.....Size....Capacity....Kind....
Number Oil Pumps .....Size....Capacity....Kind....
Number Compressor Pumps....Size....Capacity....Kind....
Number Ammonia Pumps.....Size....Capacity....Kind....
Number Brine Pumps.....Size....Capacity....Kind....
Number Miscellaneous Pumps..Size....Capacity....Kind....
For test of pumps, must steam be measured or estimated.....
.....
.....

MISCELLANEOUS APPARATUS

Refrigerating plant, kind.....Size.....Kind.....
Number of hours run per week.....Power taken.....
Volume of storage.....cu. ft.
Weight of provisions chilled per charge.....
Tons ice per day.....Sq. Ft. Cooling Surface.....
Water cooled.....Air cooled .....
Elevators, number.....Kind.. ..Load.....Speed .....
If hydraulic, give size pumps above; if electric, give size motors below:.....
.....
.....

STEAM DISTRIBUTION

Is live steam, exhaust or both used for heating.....
Approximate proportion of exhaust steam used.....
Duration of use of exhaust steam.....Back pressure.....
Square feet direct radiation served.....
Square feet direct-indirect radiation served.....
Square feet indirect radiation served.....
Square feet fan coils served (state kind).....
Steam used for heating water.....
Steam used for cooking.....
Steam used for laundry.....
Steam used for sterilizing.....
Steam used for drying.....
Steam used for other purposes.....
Total equivalent of direct radiation.....
How are pipes covered.....
Are there underground pipes.....How installed.....

EACH BUILDING

Total volume heated, including basements.....cu. ft.
Exposed wall surface (including windows).....sq. ft.
Construction of wall surface.....
Roof area.....sq. ft.
Construction of roof.....
Glass area.....sq. ft.
Double or single windows.....
Total radiation installed (direct).....
(Information as to each floor separately, if possible)
Usual pressure of steam in radiators.....
Kind of heating system (gravity, vacuum, air-line system, etc.)
.....
Kind and extent of thermostatic control.....
Number, size, revolutions and capacity of supply fans.....
Power taken by each.....
Air pressure at fan discharges when running.....in.. of water
.....
Size and kind of air washers.....
Capacity .....
Kind of humidity control installed.....
Number, size, revolutions and capacity of exhaust fans.....
Power taken by each.....
Number, size—(number of tubes, etc.) of indirect heating stacks .....
Square feet of heating surface of each.....

TUNNEL

Transmission distance—power house to building.....
Number, size and purpose of pipes in tunnel.....
Kind and thickness of covering on each.....
Cross section and construction of tunnel.....

DOMESTIC SERVICE

Size and kind of domestic hot water tanks or heaters.....
Heating surface of coils in same.....
Number of fixtures supplied with hot water.....

KITCHEN EQUIPMENT

Number and size of stock pots.....
Number and size of steam tables.....
Number and size of vegetable cookers.....
Number and size of steam roasters, etc.....
Number and size of dishwasher.....
Number of people cooked for.....
Fuel consumption.....

WATER SERVICE

Number, size and capacity of pumps.....
Pressure in mains.....
Capacity of house tank.....
Is water sterilized?.....
If so, size and kind of sterilizers.....
Fire protection.....
Size and kind of fire pump.....

WATER

Cost of water per thousand gallons.....
Water used for each month for a year.....
..(Separate, if possible, into kitchen, domestic and boiler make-up.)

ELECTRIC DISTRIBUTION

Character of distributing system.....
Condition of distributing system.....
Voltage for lights.....for power.....
Kind of lights.....No.....(make schedule)....
Total lighting load connected.....Peak.....
Length of illuminating period.....Length of peak.....
Elevator motors, number....Kind....Size....Hrs. run daily...
Laundry motors, number....Kind....Size....Hrs. run daily...
Kitchen motors, number....Kind....Size....Hrs. run daily...
Shafting motors, number....Kind....Size....Hrs. run daily...
Miscel. motors, number....Kind....Size....Hrs. run daily...
Total motor load connected.....Peak.....
.....
.....

GENERAL INSPECTION

1—Is a regular record or log of plant operation kept.....
2—Appearance of coal.....
3—Source of water and kind.....
4—Class of oil.....
5—Intelligence of engineers.....

6—Intelligence of skill of firemen.....
7—Any apparatus needing repairs.....
8—Any apparatus needing replacing.....
9—General layout of plant.....
10—Sizes of pipe.....
11—Are units run to best advantage.....
12—Loading of boilers.....
13—Cleaning of fires, number.....
14—Regulation of boiler feed.....
15—Condition of boiler setting.....
16—Design and condition of fire box.....
17—General appearance of the plant and other details.....
.....
.....
.....

TEST APPARATUS

Can coal and ash scales be provided.....
Can water measuring device be provided.....
Tap for calorimeter.....F. W. Thermometer.....
Steam Gage.....Draft Gage.....Stack Pyrometer.....
Coal storage for test.....

THE ADVANCE OF GAS FUEL IN THE HEATING INDUSTRY

III Methods of Erection and Controlling Apparatus

BY DAVID H. CUYLER.

In two preceding articles we have considered the essentials for determining the heating efficiency of gas-fired unit equipment. We will now take up the general question of methods of erection and controlling apparatus as applied to such equipment. At the start it may be stated that where gas is to be used as fuel for heating purposes, it is far more than good practice to eliminate the human factor, at least to the greatest possible degree.

TYPES OF GAS BURNERS.

The most important feature we have to consider is the gas burner equipment and its relation to the work we have to accomplish. There are several type of burners on the market, all of which have their merits, and the selection of the proper type to be used should be governed by the gas-fuel conditions in the locality where the proposed plant is situated.

Figs. 1 and 2 show two types of burners; Fig. 1 being a straight tubular burner, drilled with a requisite number of orifices to provide the maximum fuel supply. This type of burner is provided with a mechanical air mixer, as shown, which

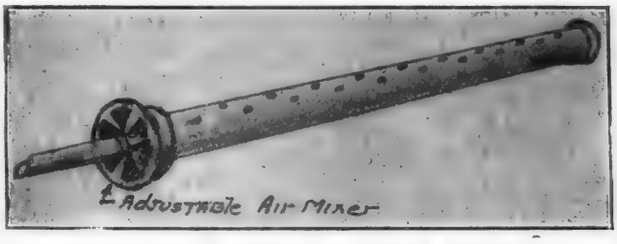


FIG. 1—TYPE OF STRAIGHT-TUBE BURNER.

is supposed to give a proper mixture of air and gas prior to the flow of the gas to the points of ignition. The air mixer is provided with an adjustable shutter for regulating the amount of air supplied.

Disadvantages of this type of burner in practice are that a variation in the pressure of the gas in the mains will necessitate a readjustment of the air supply and, as there is generally no way for the ordinary layman-user to know of these pressure variations, it becomes questionable if the proper mixture of gas and air is present or not. Again, this type of burner is subject to the dangerous trouble of back-firing, especially where the gas supply is controlled by automatic devices. The gas appliance industry has endeavored to overcome this trouble by the use of the snap-action or moment valve, but these devices are sometimes faulty in action, and have caused much trouble.

The burner illustrated in Fig. 2 is an advanced type of burner which may be called the vacuum-loop type. This burner has no mechanical air mixer. The burner loops are carefully drilled with angular orifices of just a proper size to provide the maximum amount of gas required. As the orifice drillings are on the inner slope of the tubes; the two opposing gas jets meet at a central point above the tubes, and upon ignition, form a confluent flame, the heat of which draws just the proper amount of air through the center of the loop. This gives an exact and scientific air mixture at all times. It will be seen that a variation in the gas pressure will automatically govern the amount of air taken up by the flame.

Splendid results have been obtained with this type except where the gas pressure is so low as to make it inoperative. Where such a condition exists, we may safely assume that the use of gas for fuel will be inadvisable, if not impossible. The burner can be had to fit almost any size or condition of combustion chamber and it is made in several different shapes beside the loop shape shown.

BURNER EQUIPMENT SHOULD BE EASILY REMOVABLE.

The burner equipment should be set in the combustion space of the heater firmly and yet with a ready and easy method for removal, as gas burners will get clogged and dirty, and it should not be necessary for the householder to procure the services of an expert where only the cleaning of the burners is required.

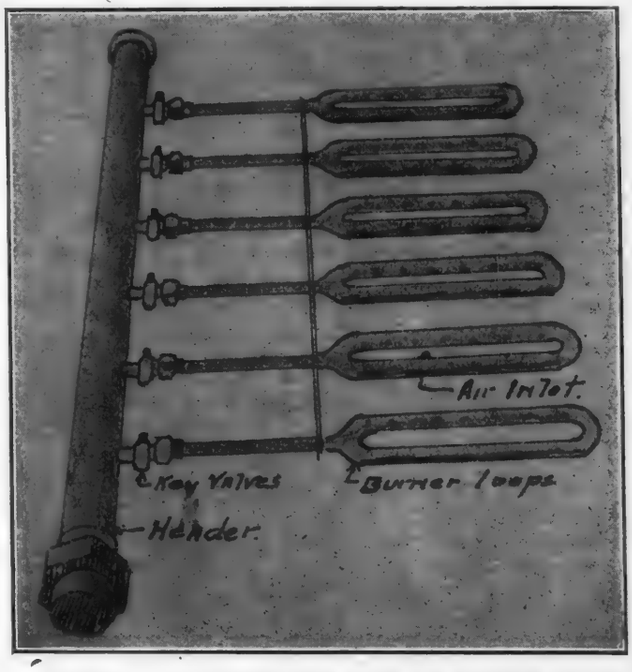


FIG. 2—VACUUM-LOOP TYPE OF BURNER.

The gas-burner equipment, after it has been properly set will be connected by the most adaptable method to the street main at the meter, and here we have a very vital part of the engineer's duties as applied to the science of gas-fuel heating. Firstly, the street main should be of more than sufficient capacity to provide all of the gas required for the several uses in the home. This is likely to include cooking; the heating of water; gas logs of heaters, and the gas-fired heating system. The hourly gas requirements of all of these appliances will have to be known and the gas service main should be installed to provide a more than adequate supply for all of them.

TWO OUNCES PRESSURE A SAFE WORKING FACTOR.

In many of our larger cities, where gas heating is being more and more favored, we have found that, as a general rule, an average pressure of 2 oz. is a safe working factor for general practice and computation. It is true that in many localities we will find a higher pressure than this, but this will be of advantage rather than detrimental. It is the district where we will find street main pressures much below 2 oz. that we must beware of. So, basing a computation on an average pressure of 2 oz. we may compile the following table for pipe sizes for mains and feeder pipes, both from the street to the meter and from thence to the burner equipment of the gas boiler.

PIPE SIZES FOR LOW PRESSURE GAS-FLOW.

2-oz. pressure. Pipe size inches Diam	length of pipe, 100 ft. Cubic Feet per hour supplied.
½	30
¾	80
1	170
1¼	300
1½	500
2	950
2½	1700

The above table is based on Dr. Pole's well-known formula and as the engineer may be called upon to meet varying conditions that will not be covered in the table it will be well to give the formula.

$$Q = 1350 \sqrt{\frac{\frac{d^5}{L} \times p}{3 \times \text{Sp. gr.}}}$$

Where:

Q = Quantity delivered per hour in cubic feet.
d = Diameter of pipe in inches.
L = Length of pipe in feet.
p = The loss of pressure and is the difference between the initial and final pressures, expressed in inches of water.
Specific gravity assumed at 0.6.

It will be noted in the table as given above, the term for pressure is in ounces rather than in inches of water. The average manometer is so graduated and the writer has found that the average gas man likes to use the term "ounces," for the same reason possibly, that we like to use inches and feet, rather than meters.

SPECIAL GAS HEATING RULES.

In the first article of this series is given the method for determining the amount of gas to be provided per hour for any work we have to perform. The above clauses and tables will be useful in providing a proper piping equipment for insuring an adequate supply of gas at all times. However, there are a few rules that should be adhered too if the engineer hopes to attain a highly efficient heating service under all and varying conditions.

1. The gas feeder pipe for the heating equipment should be taken directly from the meter connection, and not from some easily accessible house main.

2. There should be no other gas service pipe taken off this main.

3. Make the feeder pipes generous in size. It is a mistake to suppose that large pipes will result in increased gas bills.

4. By all means insure a positively tight gas pipe system, for leaky pipes cost money and above all, lower the efficiency of the system.

DETERMINING THE METER CAPACITY.

We now come to the important question of the gas meter, and here again we naturally have to cut our cloth to fit the conditions of the local source of supply. Most gas companies will provide meters for all requirements upon application, but it will be for the engineer to determine the maximum meter requirement and to so instruct his client so that his application may be made for metered service according to such requirements. For easily determining the meter capacity required for any service the following table will be found useful.

TABLE 2—MAXIMUM WORKING CAPACITIES OF GAS METERS.

For drop of 0.5 in. pressure between inlet and outlet of meter, for average capacities. (J. M. Roob)

Meter No. of lights capacity.	Cu. feet per hour that Meter will pass
5	90
10	120
20	180
30	270
45	360
60	420
80	510
100	600
150	900

The erection of the gas heater; its proper placement to insure proper secondary air supply at all times, while, at the same time, guarding the burners against drafts or strong air currents, are all important features that enter into the design of the successful gas-fired heating system.

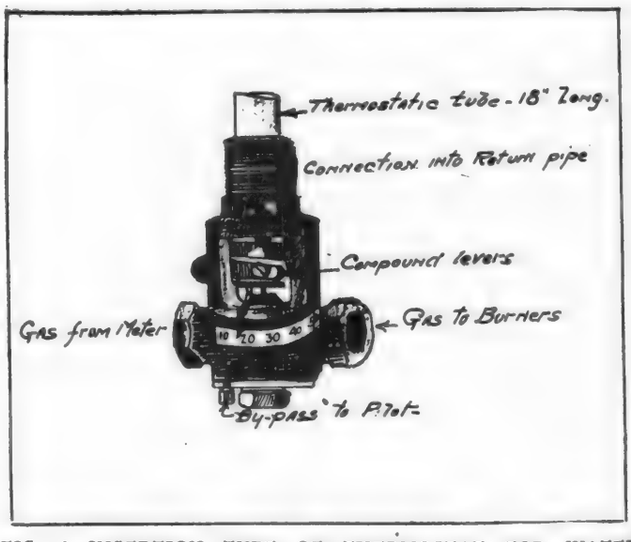


FIG. 3—INSERTION TYPE OF THERMOSTAT FOR WATER HEATING SYSTEMS.

SUGGESTIONS FOR THERMOSTAT CONTROL

As brought out in a previous article, the matter of thermostatic control is a very important one. Many gas heating appliance men are advocating the use of the electric ther-

mostat where the sensitive element is placed in one of the living rooms above the cellar. The thermostat operates a motor which in turn opens or closes a snap-action gas valve on the main feeder pipe to the burners. Some may prefer this type, but it has been found rather difficult to determine a location where an average temperature will be found at all times so that the thermostat will not have turned off the source of heat when some of the rooms in the building may require it. For water heating systems, which by the way are the most satisfactory systems where gas is to be used as fuel, we have found that far better and more satisfactory results may be obtained by the use of the insertion type of thermostat, where the sensitive element is placed directly in the return flow pipe at or near where it returns the water from the system to the heater. The body of the thermostat contains the gas valve, this being actuated by a series of levers, compounded to give the desired lift to the stem. A by-pass is provided through the valve body, so that the supply to the pilot flame is never shut off. Fig. 3 shows such a thermostat with the connections noted.

It is presumed in practice that a short period of time will give any one the required familiarity with the system so that the pointer on the regulating dial of the thermostat can be changed to suit varying weather conditions. In other words, with this method, the temperature of the water in the system is varied to suit climatic conditions and every room being heated will receive the same service. The control of the temperature in the various rooms is accomplished by the turning on or off of the radiator valves. We have found this system to be more pliant and serviceable for ordinary use and less likely to need expert attention from time to time.

The proper arrangement of piping connections to the heater; the location of the feeder pipes and supply and return pipes will of course be governed entirely by local conditions, but the sketches given above will be helpful in most cases where undue complications are not present.

In next month's issue Mr. Cuyler will take up piping details and specification clauses for gas-fired heating systems.

CALCULATIONS FOR HEATING OUTDOOR WATER TANKS

The amount of heat required to keep an outdoor water tank from freezing or solidifying is a question frequently arising and of which very little seems to be generally known. At first thought, it does seem that such tanks being, as a rule, severely exposed in open locations, such as fields, tops of hills or lofty buildings, would tend to freeze up quickly, in particular, those used for standby storage, or for purposes of fire protection where the water is but seldom renewed. This danger may be increased by leakage through the tank, which, because of the small amount, quickly freezes and coats the outside. However, such ice forms only on the outside, and the greater this becomes, the greater the degree of insulation or decrease in loss of heat from the tank.

It often occurs that too large a heating coil is installed in water tanks with the result that the water is overheated, and the loss of heat from the tank thereby increased. Many persons do not seem to realize that a steam pipe in water will condense approximately one hundred times as much steam as it will when surrounded by still air, so that in any case very little steam piping is required. The loss of heat from the tank is not very great when the water is not heated, since still water is a good non-conductor and the ice as it becomes thicker, forms more and more of an insulation for the water beneath or within.

Water at 39.2° F. is at its maximum density, and being therefore heavier per cubic foot than the colder water, settles to the bottom of the tank. In other words, water when dropping in temperature from any point above 39.2° F., contracts until it reaches that point, then expands, and after giving up its latent heat of 143 B. T. U., changes to ice at a temperature of 32°. Because of this, water freezes first at the top of tanks, rivers, etc., rather than at the bottom. Ice will also form next to the sides of the tank, since the water being still, the heat given up by the water to the outside is extracted first from that adjacent to exposed surfaces.

Water has an enormous storage capacity for heat, so that, in general, several days of extreme weather are required before any freezing takes place. Even a tank from which no water is drawn may take a number of months before all the water is solidified.

FREEZING OF WATER AT TOP THE MAIN DIFFICULTY.

The main difficulty with water tanks, during the winter months, is the freezing of the water at the top. When water is drawn, the formation of ice remains at the top, causing the float of the supply valve to stick in that position and not open the valve as required for make-up water.

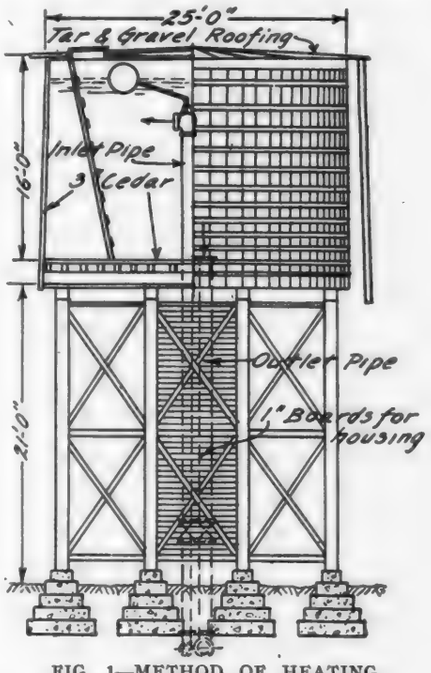


FIG. 1—METHOD OF HEATING WOODEN WATER TANK.

This difficulty may be avoided by using a valve without a float, such as an altitude valve, but this type of control valve is very expensive and requires a concrete pit in the ground below the tank. Attention, then in the case of float valves, should be given to the point of freezing, the best method being to provide sufficient heating surface near the

top of the tank, either to heat for a period of one hour once a day, or to heat the water moderately in mild weather through a small ½-in. pipe and depend upon the storage as a flywheel to carry it over the colder days.

VARIOUS METHODS OF HEATING WATER TANKS.

There are various methods of heating the water in tanks in outdoor locations. Wood tanks are usually provided with a large central wood housing, which is placed around the inlet and outlet pipes from the bottom of the tank to the ground, as shown in Fig. I. This keeps down the freezing action to a certain extent, and provides access by means of a door to the pipe and valves, which are either enclosed in three layers of 1-in. hair felt, securely bound and canvassed, or again boarded up within the housing so as to form an air space by inner and outer ⅞-in. boards. Sometimes both are done, leaving the valve wheels projecting beyond the boards for convenient control.

In the most extreme locations, these precautionary measures are supplemented by a small oil stove or a home-made sheet metal oil can (of rectangular shape and ample size) provided with an ordinary lamp burner and wick.

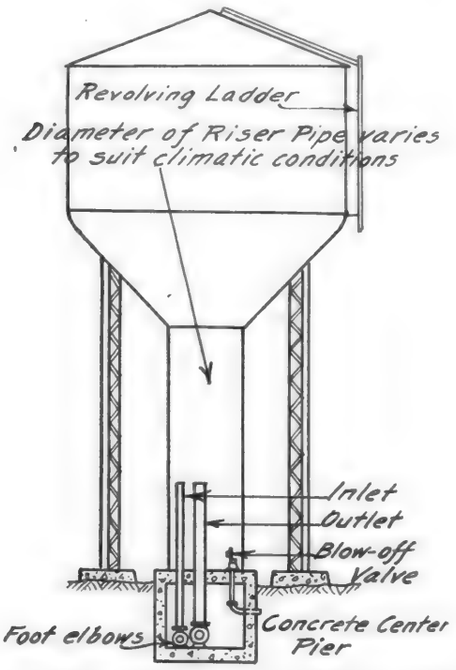


FIG. 2—STEEL TANK BUILT TO PROTECT WATER FROM FREEZING.

These are kept burning inside of the outer housing during such periods of severe weather as experience has shown to be necessary and require but little attention.

Steel tanks are often erected with no other provision for heating than insulated inlet and outlet pipes enclosed within a steel housing. Fig. 2 shows a type of steel tank in which there is no float valve while the pipes do not extend from the bottom of the tank to the ground, and thus are not exposed. The tank in this case meets grade by means of a riser pipe of very large size, which also acts as a partial support for the tank and may be varied in size to suit climatic conditions, thereby preventing freezing by the large volume of water it contains. A steam pipe may be inserted if desired, either within the tank or riser pipe.

Wood water tanks, though costly to maintain, are sometimes preferred because of low first cost, and are sometimes piped, for reasons other than prevention of freezing, so as to circulate by gravity to a water heater.

CALCULATIONS OF HEAT LOSS FROM WOOD WATER TANK.

With the previous remarks in mind, the following calculations have been worked out to show the loss of heat from a wood water tank, as in Fig. 1, the size of which is 16 feet high by 25 ft. in diameter, making a capacity when nearly full of 50,000 gal. The construction is of 3-in. cedar, except for the cover which is two layers of ⅞-in., with an air space. However, the coefficient of heat loss may be taken as uniform throughout. This is sometimes given for 3-in. wood as 0.36 B. T. U. per square foot per degree of temperature difference, but may be taken at the lower figure of 0.27, as used by the University of Pennsylvania, and often elsewhere.

Steam for heating is assumed at 30 lbs. pressure, having a temperature of 274° F., while the conditions for heat loss are figured for water maintained in the tank at 40° temperature with an outside temperature of zero.

HEAT LOSSES FROM EXPOSED SURFACES WHEN WATER IS NOT HEATED.

$25^2 \times 0.7854 = 491 \times 2 = 982$ sq. ft. in top and bottom.
$3.1416 \times 25 \times 16 = 1.257$ sq. ft. in sides $+ 982 = 2,239$ sq. ft. of exposed surfaces.
$(40 + 32) \div 2 = 36°$ average temperature of water.
$36 - 0 = 36°$ temperature difference.
$2,239 \times 0.27 \times 36 = 21,763$ total B. T. U. losses from exposed surfaces.

TIME REQUIRED TO FREEZE SOLID.

491 sq. ft. × 16 ft. high = 7,856 cu. ft.
7.48 cu. ft. per gallon at 40° temp., then
7,856 × 7.48 = 58,763 gal. when entirely filled up.
8.33 lbs. × 50,000 gal. = 416,500 lbs.
(40° — 32°) + 143 latent heat of ice = 151 heat units in each pound of water at 40° F. to ice at 32° F., then
416,500 × 151 = 62.891,500 ÷ 21,763 B. T. U. losses = 2900 hrs. ÷ 24 = 121 days, or 4 months, to freeze solid, ignoring the insulating effect of the ice and consequent decrease in exposed surface.

TIME REQUIRED TO FREEZE ONE INCH OF WATER AT TOP OF TANK WHEN WATER IS NOT HEATED.

491 sq. ft. ÷ 12 = 41 cu. ft. of water for 1 in. in depth of top surface of water.
41 × 62.45 lbs = 2560.5 lbs × 151 heat units = 386,635 ÷ 21,763 B. T. U. losses = 13 hrs., about, or
24 × 21,763 = 522,312 B. T. U. required in 24 hrs. to keep water at top of tank from freezing 1 in. thick, since all loss of heat from water in tank, takes place (due to rising of coldest water) from that at top.

HEATING SURFACE REQUIRED FOR ONE HOUR EVERY 24 HOURS FOR PREVIOUS CONDITION.

274° temperature of steam — 36° average temperature of water = 238° temperature difference.
320 B. T. U. transmission per square feet of pipe per hour per degree of temperature difference, then
320 × 238 = 76,160 B. T. U. per hour per square foot.
2 L. F. of 1½-in. pipe = 1 sq. ft. of heating surface.
522,312 B. T. U. required in 24 hrs. ÷ 76,160 = 6.8 sq. ft., or 13.6 lineal feet of 1½-in. pipe, say, 20 l. f., and locate near top of tank.

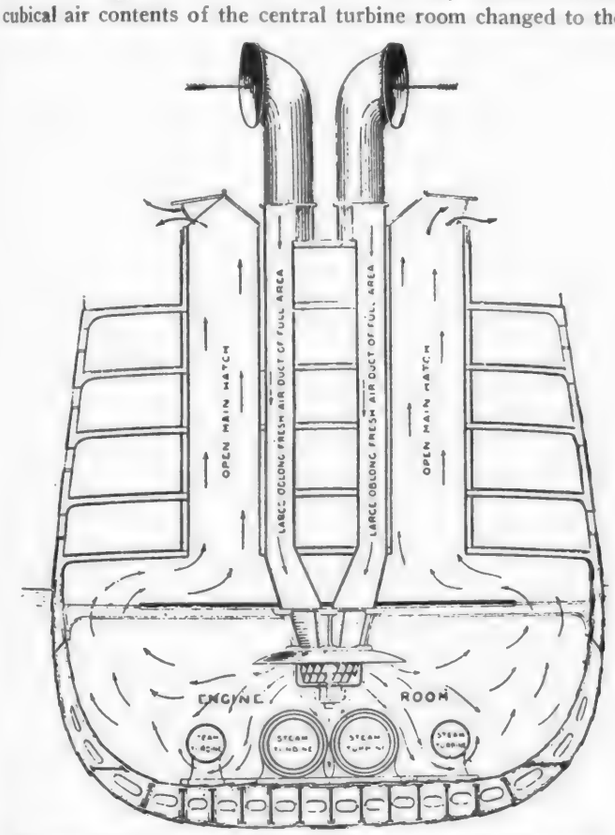
IMPORTANT WORK ON THE SCIENCE OF VENTILATION

Heating engineers will be interested in a recent publication of the Medical Research Council of England devoted to "The Science of Ventilation and Open Air Treatment." The author is Leonard Hill, director of the Department of Applied Physiology of the Medical Research Council, and a frequent contributor to the proceedings of the (British) Institution of Heating and Ventilating Engineers.

In Part II of this work, which is a volume of 295 pages, the author talks on such interesting subjects as the principles of radiation, the chemical purity of the atmosphere in crowded confined places and in mines, the smoke nuisance and the economic use of coal, dust, heat stagnation and fitness, health and environment, fever and open-air treatment, treatment at high alpine altitudes, concerning clothes, and finally, methods of ventilation and heating.

In the last chapter Dr. Hill presents, in summarized form, a wealth of information on tests and arguments reflecting on the present state of the heating and ventilating art, including, among other things, the Hill comfort chart, and the conclusions on a variety of matters connected with heating and ventilation of such investigators as Winslow, Kimball, Crowder and others.

In addition, a number of investigations are reported that may not have come to the notice of American engineers. For instance, in connection with the ventilation of warm places, such as furnace rooms, engine rooms in ships, the author shows how this can be effected by fans placed at the bottom of wide vertical air trunks (fan and trunk some 6 ft. in diameter), down which the cool outside air naturally sinks, the fan construction being such as to break up the air into such fine streams and impel it in all directions so that no draft is felt. In the case of the Cunard lines, adds Dr. Hill, Mr. Keith told him that a temperature of 150° F., when the engine room was in full swing, had been reduced to 70° F., and the whole cubical air contents of the central turbine room changed to the extent of 80 times an hour. "We are actually giving this room 6,000,000,000 cu. ft. more fresh air per hour, and that, too, without appreciable draft." The fans are called "joy wheels."


OPEN MAIN HATCH
LARGE OBLONG FRESH AIR DUCT OF FULL AREA
LARGE OBLONG FRESH AIR DUCT OF FULL AREA
OPEN MAIN HATCH
ENGINE ROOM

SCHEME FOR VENTILATING ENGINE ROOMS OF SHIPS.

Dr. Hill also has some interesting things to say regarding the ventilation of the House of Commons:

In the House of Commons 20,000 to 40,000 cu. ft. of air per minute are forced through the perforated floor of the chamber. Dust from the boots of members is carried up by the air-current from the floor, but there is no evidence that such dust is worse than in rooms where there is no plenum system. Catarrhal infection from one member to another while in the chamber is greatly lessened by the up-current. The velocity of the incoming air, heated to 63° F., cools the feet and legs of the members by sweeping over or through their footgear and trousers. The body responds by shutting down the blood-supply to the skin in these parts, which feel cold, while the mucous membrane of the nose becomes congested and swollen, and in consequence the head feels stuffy, particularly in those subject to nasal catarrh.

The Ventilation Committee, sitting just before the war, allowed Dr. Hill to make an experimental trial of introducing the air at the gallery level, and shutting up the floor inlets in a section of the chamber. When the full velocity was used the air-current swept from the gallery right across the House, and could be felt on the face when sitting on the back benches of the opposite side. By reducing the velocity and varying the temperature of this air, the conditions could be made pleasant and comfortable with a scarcely perceptible movement round one's head. Sitting where the old system of ventilation was in action the feet were chilled. The war and need for economy has prevented the trial of this new installation on the large scale.

CROSSWISE AND LENGTHWISE VENTILATION.

Dr. Hill comments as follows on the relative advantages of moving fresh air across a room or lengthwise:

As the movement of the air, not the number of changes of air per hour, is the essential factor, the direction of mechanical ventilation makes all the difference. Thus by proper direction of current from inlets and volume delivery of extract-fans rooms can be mechanically ventilated without the expense of a plenum system.

Suppose for example, a workroom is in feet $100 \times 50 \times 10 = 50{,}000$ cu. ft. capacity.

To obtain five changes of air per hour by fan ventilation $\frac{50{,}000 \times 5}{60} = 4{,}166$ cu. ft. per minute is required.

The cross-sectional area of the room, supposing the current goes lengthwise, is $50 \times 10 = 500$ sq. ft.; the mean velocity of current is then $\frac{4{,}166}{500} = 8.03$ ft. per min.

But supposing the current were arranged to go crosswise, then the sectional area is $100 \times 10 = 1{,}000$ sq. ft., and the mean velocity is $\frac{4{,}166}{1{,}000} = 4.6$ ft. per min.

Supposing the temperature of the room were kept at 60° F. and a dry kata cooling power were required of 7,* five changes per hour would give too high a cooling power if the current traversed the room lengthwise from inlet to exit, but the right cooling power if it traversed it crosswise.

* Determined by Kata-thermometer.

The effect of a fan put to stir the air in a factory is shown by the following:

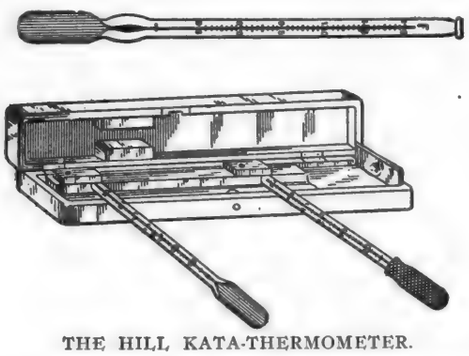
Dry kata	Wet kata	Dry bulb Deg. C.	
4.0	15.0	23.5	Fan off
6.0	25.5	23.5	Fan on

Unpleasant drafts from such a fan can be prevented by using revolving or reversible fans which blow first this way and then that.

THE KATA-THERMOMETER.

The author's frequent reference to "dry kata" and "wet kata" readings suggests the reprinting of a description of this apparatus which was illustrated and described in THE HEATING AND VENTILATING MAGAZINE for September, 1915.

The kata-thermometer was designed as a measure of comfort. The ordinary wet and dry-bulb thermometers give no indication of the rate of heat loss and of the important influences of moving air which, of course, are important factors in securing comfort. This is demonstrated by the fact that in a closed chamber heated to, say, 85° F., dry-bulb, and 80° F., wet-bulb, so long as the air is well stirred by a fan, the atmosphere feels cool and comfortable. On stopping the fan, however, while the change in temperature indicated by the thermometer is almost imperceptible, the atmosphere at once becomes unpleas-



THE HILL KATA-THERMOMETER.

antly warm and uncomfortable. The kata-thermometer is, therefore, designed to take account of these factors or in other words, to indicate the sensation actually experienced by the human body.

In construction, this instrument consists of two large-bulbed spirit thermometers, the stems of which are marked at 110° F., 100° F., and 90° F. Another mark is made just above the bulb in each case. In one thermometer the bulb is covered with a finger-stall taken from a muslin glove, this being the wet-bulb instrument. The finger-stall holds the least amount of water sufficient for taking an observation. The bulb of the other thermometer is uncovered.

In use, both bulbs are immersed in water at about 110° F. up to the mark just above the bulb. When the menisci have reached about 110° F., the instruments are withdrawn. The bare bulb is rapidly dried on a soft cloth, while the excess of water is jerked off the bulb and covering of the other thermometer. It should be noted, by the way, that if the column of spirit is not continuous the instrument is jerked till this condition is obtained, or the bulb is heated until the spirit rises into the top reservoir. After immersing and drying as indicated the instruments are rested in clips provided and the time required for the meniscus of each instrument to drop from 100° to 90° F. is taken with a watch. If a stop watch is used, when the falling meniscus reaches 100° F. the watch is started, and stopped when the meniscus reaches 90° F.

In this way the rate of cooling of the wet and dry instruments at about body temperature is found. Further readings may be taken with the instruments exposed to or screened from a source of radiant heat, or exposed to or screened from wind or draft, or again with a thick knitted finger-stall placed over the bulb to imitate the effect of clothes. In this way the various conditions affecting the comfort of the human body may be studied. When the finger stall just mentioned is damped, its efficiency is greatly diminished, illustrating the cooling effect of damped clothes. The effect of the color and texture of clothes may also be demonstrated.

A white finger-stall allows the instrument to cool when exposed to sunlight much more quickly than a dark finger-stall, as the latter absorbs the light rays and converts them into heat rays. This is what would be expected by anyone knowing the value of white clothes in tropical or semi-tropical areas.

HOW A STANDARD OF VALUE WAS REACHED IN CONNECTION WITH THE READINGS.

It may be interesting to give some account of the way in which some standard of value was reached in connection with the readings obtained by this instrument. The graduation of the kata-thermometer has, of course, to be empirical, and the process was effected by taking readings out of doors on an ideal spring day in sunshine, with a gentle, cool breeze. The shade temperature was 62° F. It was then found that the wet bulb fell from 100° F. to 90° F. in 45 sec., while the time taken for the dry bulb was 2 min. 25 sec. Screened from the sun, the dry bulb fell in 1 min. 46 sec. With a thick knitted glove, the wet bulb fell in 1 min. 50 sec., the dry bulb falling in 6 min. 27 sec. Screened from the sun, the dry bulb fell in 4 min. 23 sec. The radiant heat of the sun produced a marked effect on the dry bulb enclosed in the thick dark glove, and the observer in the same degree felt the warmth of the sun on his back. It may be noted that the variation of the temperature in different parts of the skin contributes to comfort and well-being.

In a room, on a spring day, with the window wide open, under pleasant conditions, the air moving, and no fire, the wet bulb fell in 58 sec., while the dry bulb fell in 2 min. 43 sec. On another ideal spring day, with a shade temperature of 63° F., the wet bulb fell in 40 to 51 sec., while the dry-bulb fell in 2 min. 40 sec. The times varied with the strength of the breeze and the instruments showed how the stimulation of the skin varies with the breeze out-of-doors. Shielded from the sun, the wet-bulb fell in 35 sec., dry bulb falling in 1 min. 28 sec.

On another spring day, which was not ideal, in a cold, raw wind with spots of rain falling, the wet bulb fell in 24½ sec., the dry bulb falling in 55½ sec. Inside the room, with open fire and comfortably warm, the wet bulb fell in 1 min. 9 sec., the dry bulb falling in 3 min. 5 sec. On another day, with a cold wind blowing, with a temperature of 54° F., and when an overcoat was felt to be necessary, the wet bulb fell in 25 sec. and the dry bulb fell in 51 sec. With the thick glove on the instrument the time of fall for the wet bulb was 55 sec., and, for the dry bulb, 2 min. 5 sec. In a room with no fire and with windows shut, the times were 53 sec. and 2 min. 13 sec., for the wet and dry bulbs, respectively. Hence the effect of the shelter afforded by the walls of the room was about the same as that given by the thick glove outside. In a room with a fire and no windows open, at a temperature of 60.5° F., the atmosphere being comfortable but slightly too windless, the wet bulb fell in 1 min. 7 sec., while the dry bulb took 3 min. 8 sec.

OTHER RESULTS.

On another day, with a strong fresh wind blowing and a temperature of 60.5° F., the wet bulb fell in 31½ sec. and the dry bulb in 1 min. 21 sec. In a more exposed place, the time for the wet bulb was 26 sec., and for the dry bulb 49½ sec. With the thick glove on, the times for the wet and dry bulb were 1 min. 4 sec. and 3 min. 3 sec. These figures show how relatively great is the cooling effect of wind, and the protection afforded by clothes.

Other interesting tests were as follows: On a mild day, with a slight rain and little breeze, with a temperature of 52° F., the time was 34 sec. for the wet and 1 min. 22 sec. for the

dry bulb. On a warm May day in a room with windows wide open the wet bulb fell in 1 min. 1 sec., the dry bulb falling in 3 min. 7 sec. Out of doors, in the warm sunlight, the times were 44 sec. and 4 min. 47 sec. In a railway restaurant car where the air felt unpleasantly warm and windless, the wet bulb fell in 1 min. 5 sec., while the dry bulb took 4 min 10 sec. In a room heated by an anthracite stove to 70° F. (dry) and 62° F. (wet), and unpleasantly warm, the wet bulb fell in about 1 min. 30 sec., and the dry bulb took 4 min. 30 sec. to 5 min.

The last result was considered especially interesting. In a room heated by an anthracite stove, which chiefly provides convected heat, the effect of the kata-thermometers of screening them from the stove is very slight. In the same room heated by a modern gas fire fitted with a flue, giving radiant heat, screening makes a very great difference, and the instruments show that by such a fire the parts of the room and its occupants are unequally heated and the conditions of uniformity avoided. In a chamber heated to 84° F. dry bulb and 77° F. wet bulb, the dry-bulb kata-thermometer fell in 7 min. and the wet bulb in 2 min. 15 sec. On putting on a fan the dry bulb fell in 3 min. 39 sec. and the wet bulb in 1 min. 33 sec., while the ordinary thermometer scarcely varied

WHAT THE RESULTS INDICATED.

From the above tests and results given by the conditions attendant on the healthy conditions of rooms, factories and the like can be gauged. These are that a room is best heated by an open fire or modern gas fire, that is to say, by sources of radiant, rather than convected, heat.

Air Supply for 4,000 Office Workers.

In an office building comparable in size with the home office of the Travelers' Insurance Company, of Hartford, Conn., in which there are some 4,000 employees, it is a serious problem to provide the quantity of fresh air that is required by the working force, without producing drafts. This problem, however, has been successfully solved through the installation of a fan blast system that is depended to heat, as well as ventilate, the building.

As described in the company's monthly publication, The Travelers Standard, the building is divided, for convenience, into six sections, and a separate unit of ventilating apparatus is employed in ventilating each section.

The north side of the ten-story part of the building comprises one of these sections, and the air for this portion of the building is obtained from out-of-doors through a large sheet-metal duct extending from the roof to the basement. A fan, 120 in. in diameter and operated by a 35 h. p. motor, draws in the air through this duct and forces it through the distributing system to the various rooms. The south side of the building is supplied with air by two fans and motors that draw the air in through a single duct, similar to that on the north side of the old building, and extending from the roof to the basement. One set of apparatus distributes air to the first five floors of this section, and the other unit takes care of the air supply for the five upper floors. In the tower section, the first ten floors are supplied with air obtained through a duct extending from the eighth floor to the basement, and the upper floors of the tower,—that is, floors ten to twenty-six,—are supplied by apparatus located on the twenty-sixth floor.

The basement and sub-basement are ventilated by air obtained from the duct used for supplying the ventilating apparatus on the south side of the ten-story building. All fans are driven by direct-current, slow-speed motors, and the apparatus is specially set to minimize vibration and the transmission of sound.

MUSLIN AIR SCREENS USED.

In each unit, the air that is brought in from out-of-doors is drawn into a screen chamber, where it passes through screens or air filters, consisting of fine muslin fastened over wooden frames. These frames are set between the screen chamber and the fan chamber, so that the draft produced by the fan will draw the air through the screens. The screens in each chamber are removed and cleaned every week.

After passing through the screns, the air enters the fan chamber where it is heated and driven through the distributing ducts to the rooms about the building.

ARRANGEMENTS FOR AIR VELOCITY AND TEMPERATURE CONTROL.

In the larger rooms, deflectors are provided over the outlet openings, so that the air can be delivered at a high velocity and in great volume, and still be dispersed so as not to produce drafts. The velocity of the air is also regulated by apparatus attached to the fan motors. The air temperature is regulated by thermostats, one of which is placed in each room. These thermostats are set to the desired temperature and this temperature is maintained automatically by a master thermostat in the basement.

In most places the exhaust ducts used in carrying the vitiated air out of the building run parallel to those of the blower or distributing section of the ventilating section. Two openings through which air enters the exhaust ducts are provided in each room. These two openings are always on the same duct, one being near the floor and the other near the ceiling. In cold weather the upper opening is closed and the cold air is removed from the room through the opening near the floor. In warm weather, when it is desired to remove the warm air, the lower opening is closed and the air is taken out through the opening near the ceiling.

The air that is removed is carried along the exhaust ducts by a suction created by electrically-operated exhaust fans. In each section of the building a double set of fans is used, one of which draws the vitiated air from the toilet rooms, while the other is operated for the office rooms only. Four of these fans are located in the pent-house over the ten-story part of the building, and in the tower section two fans and motors are located on the eighth floor and two more on the twenty-sixth floor. The exhaust fans and motors serving the basement and sub-basement are situated in the basement and discharge into a flue in the north side of the building. This flue was once used to carry off the gases from the boilers in the basement, but when the new smoke flue in the tower was completed, the old one was no longer needed for the boilers, and it was therefore put to good use in connection with the ventilating system, as indicated. The fans and motors used in the exhaust or removal system are similar to those used in the supply system.

Proper ventilation is maintained in the toilet rooms about the building by independent ducts which furnish an amount of air equal to twice that required by the local board of health and by standard authorities on ventilation, and the ventilating system is operated continuously during office hours.

The exhaust system in the workrooms is also in continuous operation during working hours, but in warm weather when the employees desire to work with the windows open, the supply system is operated only as it may be needed. The entire ventilating system is started in operation, on the morning of each working day, about three hours before the regular office hours. During the noon hour the fans are operated at full capacity, in order to change the air thoroughly in every room.

The blower system is capable of furnishing 11,000,000 cu. ft. of air per hour. The combined length of the ducts through which the air is passed is 116,160 ft. (or twenty-two miles), and 464,640 lbs. (or 232 tons) of metal were used in constructing them. Six centrifugal blower fans, one centrifugal exhauster, and seven propeller or disk-type fans are used. To operate all the fans at full speed requires about 150 h. p.

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KENT, Carpenter and now Allen! The wheels of Time move inexorably in their prescribed course and we who remain can only thank God for the inspiration of our leaders who are taken from us, and press on in the paths they have blazed so well. John R. Allen is dead, but the inspiration of his life will not die. Let us see to it that the torch he held aloft is caught up and carried on as he would have carried it.

MEDDLING with a term so well known and in such wide use as the British thermal unit (B. T. U.) is apt to lead to unfortunate consequences. This is so because the use of the B. T. U. is not confined to any one branch of engineering and unless a change is agreed upon by all interested parties, confusion inevitably follows. A striking illustration of this fact comes from England itself, where the B. T. U. originated. It seems that three or four years ago the British institution of heating engineers adopted a new name and symbol for the B. T. U., partly to distinguish it from the commercial unit of electricity, the "Board of Trade Unit," which is also generally abbreviated B. T. U. The new name as adopted by the institution was the "therm."

However, as the result of an act recently passed in England, gas will in future be sold according to its thermal value, instead of by volume and the gas companies have adopted the "therm" as a measure under the new act. But the "therm" adopted as a gas measure is 100,000 B. T. U., that is to say, it is equal to 100 kilo-therms (one quintal-therm) of the unit put forward by the British heating engineers. Moreover, the heating engineers in France are proposing to make use of the term "thermie," using this word to indicate the quantity of heat absorbed in raising one ton of water through one degree Centigrade. In other words, the French unit "thermie" is equivalent to 1000 calories. President Nobbs, of the British institution, in commenting on this situation, admits that "it looks as if our lead in adopting the word 'therm' with a view to avoiding misunderstanding is likely to have the opposite effect."

THOSE who attended the recent exhibition of the chemical industries in New York must have been impressed by the extent to which heating and air conditioning processes have become an essential factor in this field. Practical evidence that manufacturers of heating appliances are thoroughly alive to the situation was furnished both in the character and number of their displays. It made a heating man feel very much at home to walk through the exhibit hall, while, at the same time, it must have been a matter of surprise in many cases to note the unexpected uses of apparatus and devices that have always been associated with more familiar lines of work.

The exhibition served the heating trade, first, in widening the horizon of those who are already well established in the chemical industrial field and, second, in awakening both manufacturer and engineer, who have not gone in for this work, to the possibilities that lie before them in a field that has scarcely been scratched.

TRADE journals are faithful reporters of the important trade conventions in their field and, as a rule, give their readers pretty clear pictures of the place occupied by their industry in the affairs of the country. It is well sometimes to reverse the process a bit and let the trade see what is happening in the trade journal field. A convention of the Associated Business Paper Publishers was held in New York recently which, in many ways, was most significant. So far from accepting a place secondary to that occupied by the general magazines, the meeting exhibited a note of dominance that was reflected in the papers, in the discussions and in the facts of the situation, as borne out by statistics. It was shown, for instance, that the talent sought for and obtained in the trade journal field is of the highest order, with the result that the trade journal has ceased to be a reporter of current events and progress only, but is rapidly becoming a leader in directing the lines of progress. This is so, not because of any ambitions in that direction, but because the trade journal has reached a point where it is in a position to know what is the trade's best line of development and, through this position, to act as an acceptable spokesman in showing the way. In short, the old-time trade paper which contented itself with reflecting the activities of the trade has given way to the journal whose first function is that of leadership in the field it represents.

WRINKLES

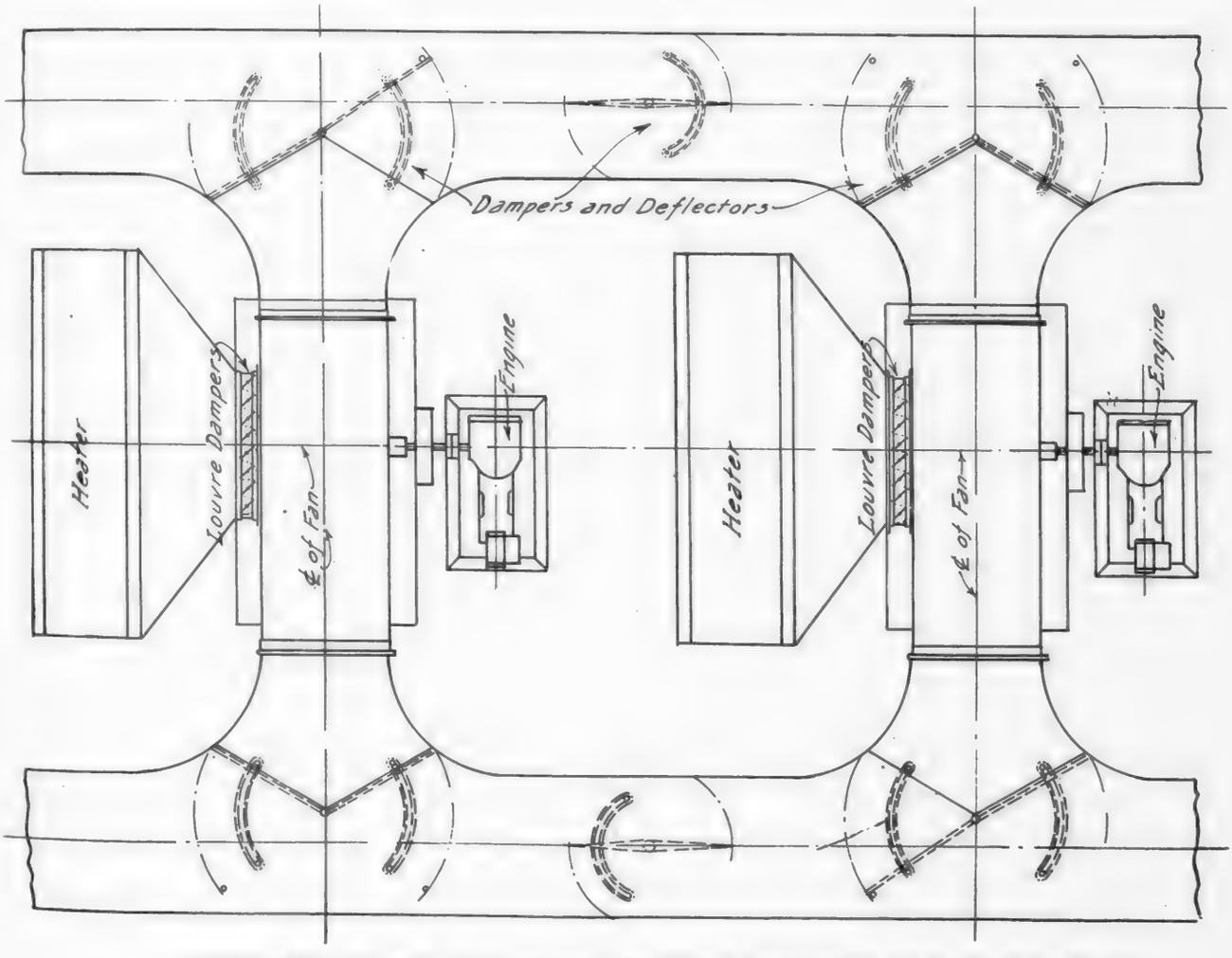
An Arrangement of Fans and Dampers Permitting Flexibility of Heating System in Accordance with Weather Conditions or Repairs to the System.

In connection with by-passes and similar piping arrangements it is often possible that so many things can be accomplished, the designer himself may be confused in the methods of operation, in particular when the situation changes from the more readily comprehendable diagram in the drafting room to the actual installation in the field, of which only a portion is visible from any one point.

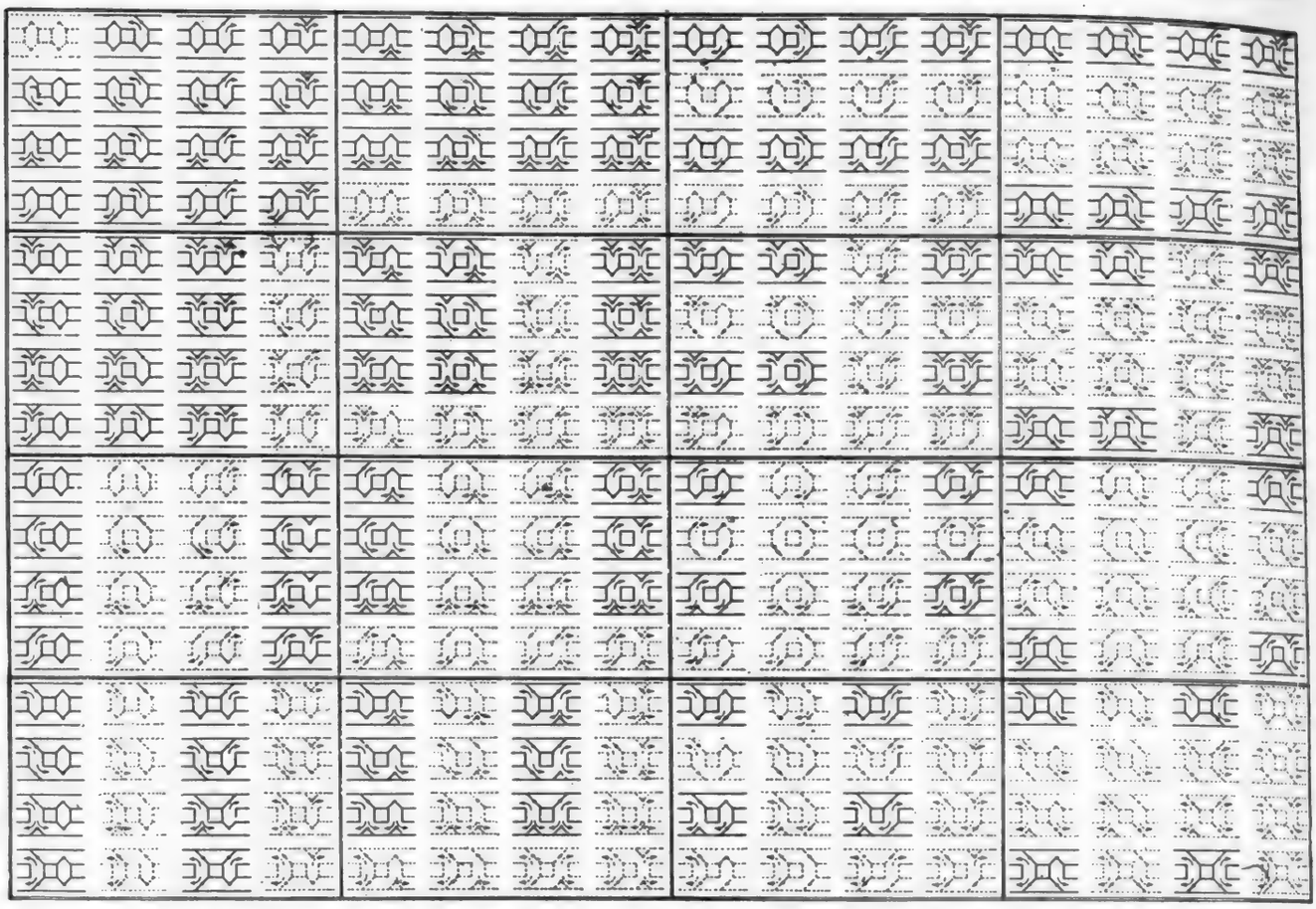
As an example of the foregoing, the accompanying sketch shows two heating sets arranged in duplicate—a more flexible arrangement and one permitting both sets to operate together or independently, or either set to operate while the other is closed down. In like manner, the two fans are each with top and bottom horizontal discharge into the same system of ducts, so that the system is in reality quartered, and each fan at its point of connection to the system is provided with two deflectors which may be set so as to discharge wholly or partially in either direction. A stop damper is also located on each side midway of the deflectors so that the air to either end of that side may be throttled if found desirable. Thus it will be seen that the system can be run to a certain extent in accordance with weather conditions or repairs on any section of the system while the supply of air to any section may be cut down or built up as found desirable.

There are eight deflectors in all, each of which combines with the adjacent deflector so as to form one damper, making a total of four dampers each of which has four positions. Each of these four positions may be maintained while the remaining dampers have been set in all possible combinations.

The problem is to find how many combinations of four things may be made, taking four in each combination. This may be expressed according to the algebraic law of combinations by the formula which in this case is $4(4^{n-1})$ of which n equals the number of combinations. Thus, $4(4^{n-1})$ or $4(4^3) = 256$ different positions of the dampers of which four result in closed fan outlets and are, therefore, of no use so far as possible methods of operation are concerned. Of the remaining 252 positions, 120 different methods of operation are possible, the balance of 132 being different positions resulting in similar methods and inadvisable to use, as will be seen by noting the dotted portions of the diagrammatic arrangement of 256 combinations.



ARRANGEMENT OF FANS AND DAMPERS PERMITTING FLEXIBILITY OF HEATING SYSTEM.



DIAGRAMMATIC SKETCHES OF 256 POSSIBLE POSITIONS OF DAMPERS OF FAN HEATING SETS.

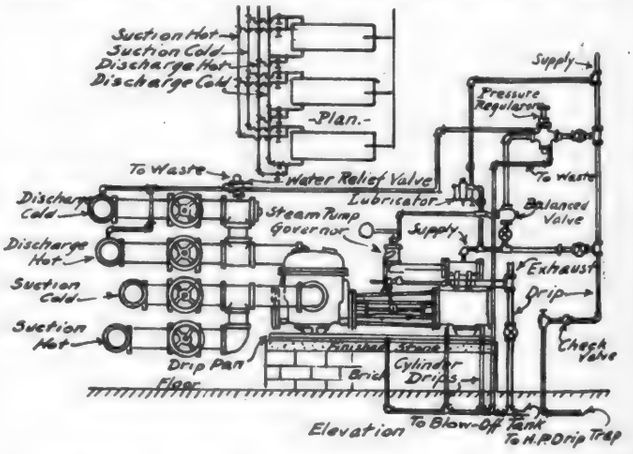
No. of Fans in Service at Any One Time	Method of Operation—Each Fan Discharging Into the System As Noted	No. of Fan Discharge Outlets Open to The System	Portion of System Receiving the Discharge of One or More Fans—Remaining Portions Closed Against Entrance of Air Supply	Number of Different Methods of Operation
Either 1	—	1	Any ¼	8
" 1	—	1	Either Side	4
" 1	—	2	" End	4
" 1	—	2	" of two quarters diagonally opposite one another	4
" 1	—	2	Any ¾	8
" 1	—	2	All	2
2	Joint	2	Any ¼	4
2	"	2	Either Side	2
2	Independent	2	" "	2
2	"	2	" End with Either 2 of the 4 Discharge Outlets Open	4
2	"	2	Either of 2 quarters diagonally opposite one another with either 2 of the 4 Discharge Outlets Open	4
2	"	2	Either Side Served by One Fan with Any ¼ by the Other Fan	8
2	"	2	Two Sides	2
2	Joint	3	Any ¼ with Any Additional ¼ Served by Either Fan Alone	16
2	"	3	Any ¼ with Either Side Also Served by Either Fan Alone	8
2	"	3	Either Side with Any Additional ¼ Served by Either Fan Alone	8
2	"	3	Either Side with the Opposite Side Also Served by Either Fan Alone	4
2	Independent	3	Either Side with Any Additional ¼ Served by Either Fan Alone	8
2	"	3	Either Side with the Opposite Side Also Served by Either Fan Alone	4
2	Joint	4	Either End	2
2	"	4	Either of 2 quarters Diagonally Opposite One Another	2
2	"	4	Any ¾	4
2	"	4	All	1
2	Independent	4	Two Ends	1
2	Joint One Side—Independ. Other Side	4	Any ¼ with Either Side	4
2	"	4	Either Side with the Other Side	2
			Total =	120

SCHEDULE OF POSSIBLE COMBINATIONS IN PROBLEM CITED.

The flexibility of this arrangement and the possible number of combinations are surprising and may be tabulated as shown in the accompanying schedule:

Piping Connections for Automatic Control of Boiler-Feed Pumps.

The piping connections with their various devices for controlling the operation of boiler-feed and other pumps are of interest in that they vitally affect the operation of such pumps and do this automatically. Of equal interest is the piping arrangement which, as shown diagrammatically at the top of the sketch, allows the use of the same house or service pumps for either hot-water or cold-water service as required. It is advisable to use three pumps, one for cold water and one for



STANDARD PIPING CONNECTIONS FOR AUTOMATIC CONTROL OF BOILER-FEED PUMPS.

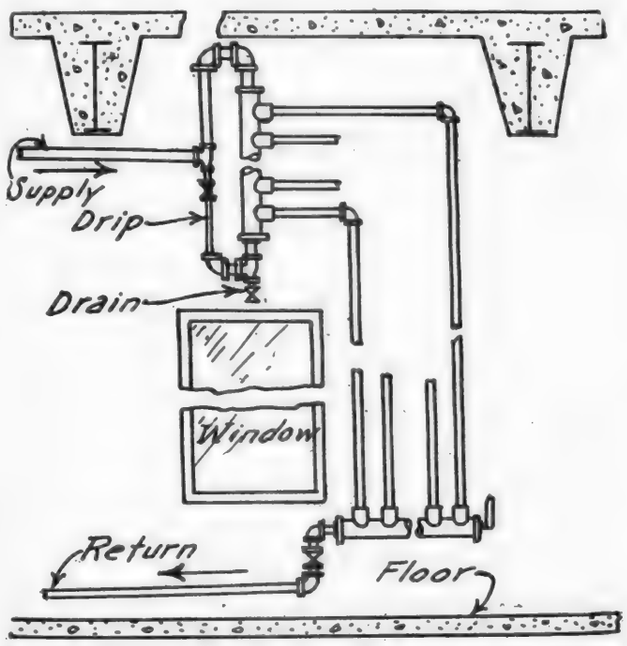
hot water, with the remaining pump held in reserve for either service.

The pump as shown in the sketch is controlled by means of a pressure regulator with small pipe connected to the discharge line. This regulator automatically starts the pump when the line pressure drops below the desired point and stops the pump when the pressure becomes excessive.

A speed regulator or governor is another device which is automatic, its purpose being to prevent an excess speed or tendency of the pump to race when a sudden demand is placed thereon. The governor is connected to the piston and also to the balanced valve so that the steam supply to the pump is controlled, regardless of the action of the pressure regulator. The latter starts and stops the pump in order to regulate the discharge pressure whereas the governor controls the speed of operation after the pump has been started and thus prevents an injury to the pump or piping.

Eliminating a Separate Drip from a Pocket in a Steam Main by Draining Through a Pipe Coil.

In the running of pipes, no two heating systems are exactly alike since structural conditions determine, to a large extent, the method used. Quite frequently, what is known as a rise or drop becomes necessary, the latter referring to a drop in the steam main in the direction of the flow of steam, which may often be necessary in order to pass under some obstruction, while the former refers to a point in the piping system where the steam main rises vertically in the direction of the flow of steam for the purpose of placing the remaining portion of the steam main at a higher elevation.



ELIMINATING A SEPARATE DRIP FROM A POCKET IN A STEAM MAIN BY DRAINING THROUGH A PIPE COIL.

A drop involves no particular difficulties, but the foot of a rise must necessarily be dripped to prevent a collection of water in the heel of the rise. This is the condition shown in the accompanying sketch where the ceiling girders limit the height of the steam main. The radiation in the form of pipe coils is placed at a higher elevation and a ¾-in. drip pipe is taken from the heel of the rise and connected into the branch tee so as to drain the steam main through the lower portion of the pipe coil. This method eliminates a separate drip which would require a steam trap and connection to the return main on the floor.

The drip pipe must be of small size and pocketed as shown so that only condensation will blow through the pipe, otherwise part of the steam supplying the coil might short circuit and, in this way, reach the air valve and close it before all of the air has been freed from the coil.

Two Methods of Weighing Boiler-Feed Water.

The weight of boiler-feed water is a matter quite often determined by means of duplex-piston meters or Venturi meters, though another accurate method is to weigh the water in barrels as shown by Fig. 1, the filling of each barrel being automatically indicated by means of an electrical alarm. A float placed in a barrel is attached to a piston which, rising with the float, rings a bell by closing the circuit. The piston moves through a 2-in. pipe which also serves as a vent to relieve any pressure tending to burst the barrels.

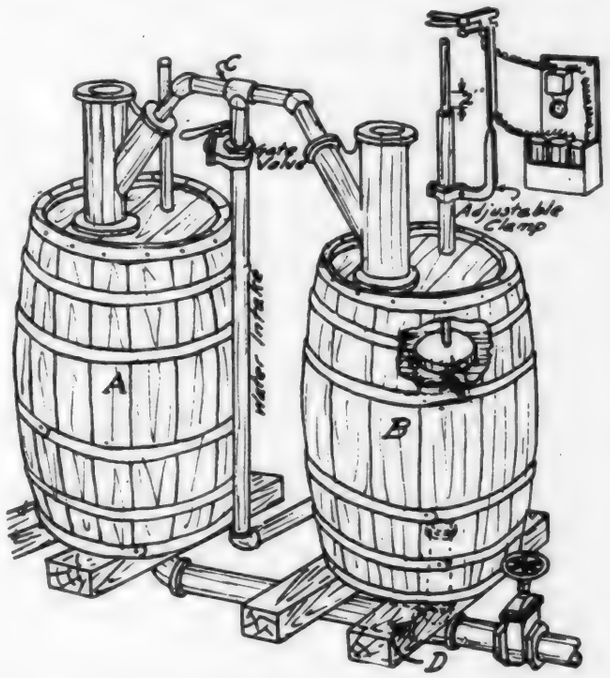


FIG. 1—WEIGHING BOILER-FEED WATER BY MEANS OF BARREL AND FLOAT-ACTUATED ELECTRIC ALARM.

After determining the weight of water for a filled barrel, the number of such fillings may be recorded as indicated by the bell, the supply valve being closed at each filling and the outlet valve opened. Small boilers only require the use of barrel B, the pipes being plugged at C and D.

Professor F. L. Pryor of Stevens Institute makes use of the method shown in Fig. 2. Feed-water is obtained from four 23-in. by 60-in. tanks arranged in pairs, with each pair consisting of one air tank and a second tank for water, fitted with gauge glasses so that the two pairs may be used in alternation. As the gauge glasses are graduated in inches, water may be supplied from one set of tanks to the boilers from the highest to the lowest graduation on the glasses. When emptied, city water supply is admitted to the tanks, and the other set of tanks, which have been filling in the mean time, are thrown over so as to supply the boilers. The weight of water between each graduation on the water gauges is previously determined by drawing off and weighing.

Water at a temperature of about 45° F. is pumped into the bottom of each water tank while air at 80 lbs. pressure is sup-

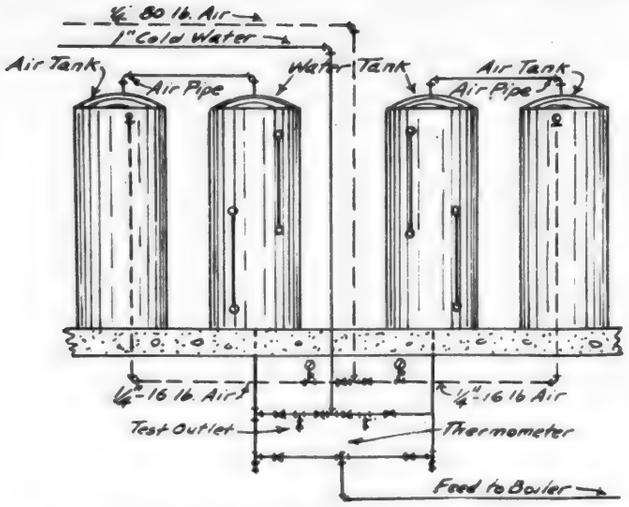


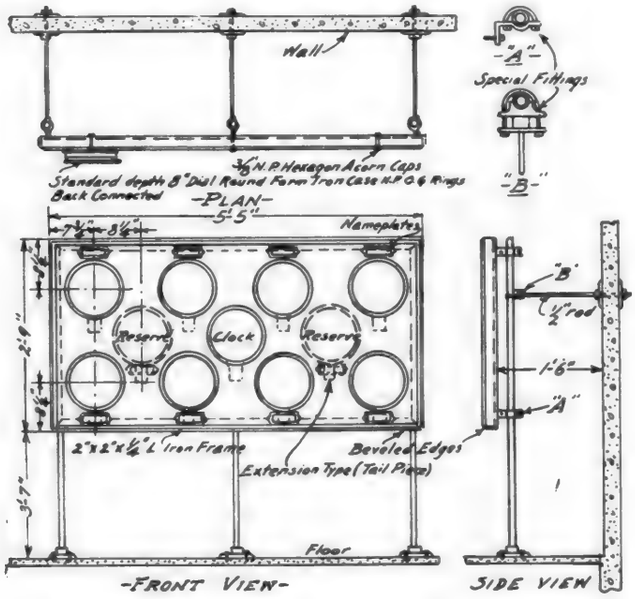
FIG. 2—ARRANGEMENT OF AIR AND WATER TANKS FOR WEIGHING BOILER-FEED WATER.

plied and reduced to maintain 16 lbs. at the air tanks, a pressure sufficient to force the water into the boilers against the boiler pressure. The air and feed tanks of each set are connected at the top by a 1 in. line and a ¼-in. air connection is made to the top of each air tank so as to replace any air which the water might carry away.

Selection and Mounting of Recording Instruments.

The selection of recording instruments for the boiler plant is a matter ordinarily given but little attention as compared to the mechanical apparatus, though, nevertheless, an important factor in the recording of vital operations. Specifications are usually of too general a nature and vague as to the requirements, not only in the matter of installation but also in that of selection of both gauges and gauge boards.

Any instrument may be accurate and still retain such external features as will harmonize with the immediate surroundings or with the other instruments throughout the plant. Round-form iron gauges with 8-in. dials and nickel-plated O. G. rings are more generally used. The cases should be of standard depth, uniform in size, design, material and finish.



METHOD OF MOUNTING RECORDING INSTRUMENTS ON GAUGE BOARDS.

The gauge board shown in the sketch has a clock in the center which is of the same size and finish as the other instruments on the board, and as a precautionary measure space has been held in reserve on each side of the clock for future gauges. It will be noted in this respect that the appearance of the board is symmetrical, whether or not such future instruments are installed.

Instruments of other than round form, as with those having tail pieces, as shown dotted in the sketch, are not as neat appearing, though claimed to be more accurate since the arc is described by a pen pivoted from a central point in the extension below the dial. In an instrument of round form, the pen is pivoted from the side so that the parts are of necessity somewhat smaller, but by simplification, such working parts are made so as to take up less space. A round-form clock will harmonize with any other type of instrument, though the extension type may be obtained if desired.

The gauges are so mounted on the board that the minimum clearance between their circumferences is 2 in., with 3 in. allowed along the outside edges of the boards. All gauges are with back connections and 18 in. is allowed back of the board for access. Each gauge is provided with a union cock and syphon water seal, all pipe or fittings which show being of nickel-plated brass.

Using white opal glass nameplates (1⅝-in. by 4¼-in. in size) set in nickel-plated brass holders makes a good appearance against a background of dull black marine slate, the service of each instrument being indicated in letters 13/32 in. in height with 3/16-in. space between lines. Letters are depressed and filled with black enamel rubbed in, for if raised they are liable to chipping. They may be in standard colors to suit the plant piping or if wooden gauge boards are used, prominent white letters on a black background are more desirable.

Gauge boards and switchboards should be without flaws or seams and should harmonize throughout the plant. They are usually made with ½-in. bevelled edges and of 2-in. thickness, depending upon the size. Only finished nickel-plated hexagon acorn caps should show on the front of the board. Gauge boards may be uniformly supported by enclosing in a 2-in. angle-iron frame to which is attached 1¼-in. iron pipe uprights, crossbraced and connected by special fittings as shown.

Annual Meeting of Smoke Prevention Association.

Many matters of interest to heating engineers were brought up at the convention of the Smoke Prevention Association which was held in Chicago, October 5-8, after a lapse of two years. Thomas F. Clark presented a paper on "Chimneys and Chimney Draft," in which he discussed steel stacks, guyed and self-supporting, concrete stacks, common brick and radial brick stacks, as well as wooden stacks used in certain chemical work. He also went into the matter of design.

Dr. E. Vernon Hill, acting chief sanitary inspector of Chicago was also one of the speakers, his subject being "A Suggested Solution of the Municipal Smoke Problem." Dr. Hill suggested action by cities in obtaining the properties of gas companies and adding by-product ovens so that all domestic coal coming to the city could be treated to recover the by-products. This would leave the residue, semi-coke, available for domestic heating. Detailing his plan he proposed the adoption of block plans for heating and stated that surveys are now being made on the north side of Chicago with a view of installing such block plants, which could serve an entire block or several blocks. He figured that the adoption of this plan, including the operation of city gas plants in the way he suggested, would mean a saving of $2,000,000,000 in fuel throughout the country. Several papers were presented on the use of pulverized coal.

One of the principal speakers at the Wednesday afternoon session was Professor A. C. Willard whose subject was "Heating Boilers and Furnaces, Power Plant Design and Ventilation." In the matter of excess air admitted to boiler furnaces he considered that in the average plant, depending on the fuel used, this should be from 15 to 18 lbs. per pound of coal burned, rather than 20 to 24 lbs. which is so often found to be the case. In connection with ventilation, Professor Willard discussed air leakage into buildings, the high cost of ventiiation and the effect of air in piping and radiators. As he spoke only from notes his address was not given out for publication. It will appear however, in a later issue.

The new officers elected are: President, Joseph M. Lonergan, New York; first vice president, W. A. Pittsford, Kewanee, Ill.; second vice president, J. W. Burrows, St. Louis, Mo.; secretary-treasurer, F. A. Chambers, Chicago.

The new president, Mr. Lonergan, is chief sanitary inspector for New York City.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

Opening Meeting of New York Chapter.

A large attendance marked the opening meeting of the New York Chapter which was held October 18 at the Building Trades Club. It was held jointly with a special meeting of the society itself, called to act on the matter of increasing the society's dues. The members voted unanimously to submit the proposed amendment to the membership at large, and take final action, as provided in the constitution, at the society's annual meeting in January.

President Walter L. Fleisher opened the meeting. He then turned the gavel over to Vice-President Champlain L. Riley to conduct the special meeting of the society. On resuming the chair, Mr. Fleisher stated that last year the chapter had devoted itself largely to the duty of the engineering world to society. The coming year he proposed that the chapter consider at its meetings the opportunity of the engineer in the industrial field. As a beginning in this direction he announced as the subject of the evening, "The Transition of War Plants to Peace-Time Industries." The speaker of the evening was A. H. Cubberly, of the DuPont companies.

Mr. Cubberly stated that the problems involved in present-day industry are: 1, elimination of wastes; 2, proper planning; and 3, maintaining the interest of the workers. The length of time money is tied up in any manufacturing process is an important item that is coming to be more fully appreciated. He said his company favored the payment of bonuses to the workmen, and at the same time, had adopted the policy of developing their physical life through the holding of athletic meets and the maintenance of hospitals for their exclusive use. He said the problem of maintaining the interest of the workman when he has no part in the ownership of the factory is the big problem American business men will have to face before long.

He told how the DuPont industries had gradually been placed on a peace-time basis and described the methods by which they were able to take their place in the industrial field. Among other methods he mentioned was that of analyzing territory and making extensive surveys in them to see what were the probabilities for certain sales. In a number of cases, he said, the company had been able to make necessities of what had always been considered as luxuries. The idea of making each day a better day for the farmer, for instance, meant the introduction of certain little luxuries in the farm home which were helping to give more color to farm life and make it more attractive.

Plans for future meetings of the chapter were announced by President Fleischer. The November meeting was to be devoted to "'Chimneys—Their Theoretical Design, Construction and Troubles." The subject for the December meeting is "The Vehicular Tunnel—Its Ventiiating and Engineering Problems," Champlain L. Riley, chairman. In January the subject will be "The Young Engineer—His Practical Problems." The February meeting will be a fuel session. In March the chapter will inspect the Carrier laboratory in Newark where the members will be the guests of the Carrier Engineering Corporation. The April meeting is scheduled to discuss "Compulsory Ventilation of the Merchant Marine," while in May it is proposed to have an interchange of chapter papers.

Western New York Chapter

The heating plant for the new Eastman School of Music and Theatre, was described in an interesting manner by Professor Allen S. Crócker, of Rochester, N. Y., at the opening meeting of the Western New York Chapter, held at the Iroquois Hotel, Buffalo, October 4. Another address at the same meeting discussed modern practice in dry kiln work.

Some 50 members and guests were in attendance. Professor Crocker, in his address, described at length the system of heating, ventiiating and air washing being installed in the new Eastman School, which is a gift of George Eastman, of Kodak fame, who has resided in Rochester all his life. The building will cost $4,500,000. Professor Crocker stated that the architects had designed a very imposing structure and his description of the mechanical plant gave the members a clear idea of the methods used. His description covered everything, from the power plant, through the auditorium, school rooms and the theatre of this building.

The second speaker, J. E. Imrie, consulting engineer for the Cutler Dry Kiln Co., told of the modern dry kiln that the Cutler people are building for the drying of all types of wood products. Moving pictures showed the operation of the kiln and the kinds of lumber being dried. Mr. Imrie's talk was not only interesting, but the pictures gave a complete story of the course of a piece of lumber from the time it leaves the forest until it is safely embodied in a handsome car or living room table.

In closing President Coe appointed a nominating committee consisting of W. G. Fraser, L. A. Harding and Grant Whittlesey, to nominate officers to be elected at the December meeting.

Kansas City Chapter's First Meeting for the Season.

Fuel efficiency was the principal topic for discussion at the opening meeting of the Kansas City Chapter, which was held October 1 at the Savoy Hotel. H. C. Balsinger, of the Kansas City Prudenized Coal Co., introduced the subject.

The election of officers resulted as follows:

President, John H. Kitchen, John H. Kitchen & Co., engineers; vice-president, Linn W. Millis, Security Stove Co.; secretary, George P. Dickson, the B. F. Sturtevant Co.; treasurer, R. Ward Hillman, United States Radiator Corporation. Board of Governors: F. A. Sheppard, Johnson Service Co.; B. Natkin, Natkin Engineering Co.; R. M. Stackhouse, American Radiator Co.

The following committees were appointed: Membership, Martin Hauser, chairman, General Heating Supply Co.; Herbert E. Barth, American Blower Co.; L. A. Stephenson, Powers Regulator Co.; Benjamin F. Cook, Gillham Engineering Co.; and W. W. Howe, Ideal Heating Co.

Publicity Committee: John Pease, chairman, Kewanee Boiler Co.; F. A. Sheppard and George P. Dickson.

The policy of inviting outside speakers of prominence will be continued. The membership of the chapter has been increased to 45 by the election of Sydney Pines, Kansas City; Everett Kirker Campbell, Kansas City; W. R. Threelfall, Wichita; George Edward Foley, Kansas City; and Alvin Dudfield, Liberty.

Michigan Chapter Discusses "American Plan of Employment.

An address by D. N. Kennedy, president of the Detroit Heating and Plumbing Contractors' Association on "The American Plan of Employment" was the feature of the October meeting of the Michigan Chapter, held in Detroit, October 11. A discussion of the business affairs of the society and chapter followed, and plans for the coming year's work were discussed.

The officers of the Michigan Chapter gave a dinner in Toledo recently to a number of Toledo men who were eligible to membership in the society and extended an invitation to them to become members of the Michigan Chapter. As a result of this meeting, fourteen applications from Toledo men were received and it is expected that at least ten others will follow. The Michigan Chapter has arranged to hold at least two of its meetings this season in Toledo.

New Officers of Illinois Chapter

New officers were elected as follows at the opening meeting of the Illinois Chapter, held October 11, at the Engineers' Club, Chicago; President, J. C. Hornung; vice-president, E. J. Claffey; treasurer, August Kehm; secretary, Benjamin Nelson. Board of directors: John Howatt, the retiring president; G. W. Hubbard and F. Van Inwagen. The ranks of the chapter were increased by the election to membership of W. J. Uhlhorne, C. D. Allan, R. N. Rosenbach, John C. Burger and R. B. Dickson.

Following a report of the committee on smoke prevention, through Charles F. Newport, chairman, Dr. E. V. Hill outlined his scheme for the operation of municipally-owned gas plants and the promotion of block plans of heating which was the subject of his address at the recent convention of the Smoke Prevention Association. It was voted to continue the committee.

Methods of conducting chapter meetings were discussed, S. R. Lewis speaking in favor of debates. Other suggestions were for discussions of the work of the society's Research Bureau and in connection with oil burning in small boilers.

Progress of the Model Chimney Ordinance.

A revised draft of the proposed model ordinance for the construction of chimneys which, as announced last month, has been drawn up by the National Board of Fire Underwriters, is now ready and has been submitted to the various organizations interested for their final approval.

In commenting on the ordinance in last month's issue, the statement was made that the draft as changed had met with the approval of the American Society of Heating and Ventilating Engineers and other bodies. We are advised by Secretary C. W. Obert, of the heating engineers' society, that this statement is premature, the preliminary draft having been worded in that manner in anticipation of such approval. As yet, however, the heating engineers' society has taken no definite action on the ordinance.

CORRESPONDENCE

Discrepancies in Heat Transmission Factors.

EDITOR, HEATING AND VENTILATING MAGAZINE:

Upon examining sheets showing B. T. U. losses for various types of construction, recently published by you, we have noted what appeared to us to be discrepancies and are writing you for more information.

Your Standard Data Sheet No. 1-A, under the heading of brick wall, one side furred and plastered, shows than an 8-in. brick wall has a heat loss of 21 B. T. U. for a temperature difference of 70° F. According to Sheet No. 1-E, under heat loss coefficients for frame walls, one side covered with paper and clapboards and one side lath and plaster," the B. T. U. loss for a temperature of 70° is 21.7.

It is obvious that plastering on both types of walls will resist the same amount of heat; therefore, in comparing these values the plastering can be disregarded. We have, therefore, in effect, a statement that a layer of paper and siding (presumably without sheeting) has an equal heat resisting value to an 8-in. solid brick wall.

We are quite sure you would not make such an assertion, and we think this must be an error. Will you kindly let us know your views on this matter?

The Common Brick Manufacturers' Association of America. Cleveland, O.

The coefficients of heat transmission to which our correspondent has reference do not show equal values for the two types of construction, but instead a value favorable to the brick wall.

At the outset it may be pointed out that some authorities, for the case in question, would give greater B. T. U. losses for brick than for frame walls. Twelve other authorities give losses ranging from 16 to 21 B. T. U. for brick and 30 to 31 B. T. U. for frame construction The University of Pennsylvania, in a compilation of factors as given by the leading authorities (published in THE HEATING AND VENTILATING MAGAZINE for December, 1918) adopts the average of 27 and 31 B. T. U. respectively.

In covering such a complete line of wall construction as given in the Data Sheets, it was, of course, necessary to adopt values as developed by several different authorities. For instance the coefficients for the brick wall were those used by one set of authorities while those for the frame wall were in a number of cases of necessity compiled from some other source or authority. Therefore the effect mentioned by our correspondent is the result of accepting certain authorities upon the construction with which they have experimented and then accepting other authorities for other constructions upon which the first have not experimented. Just which coefficients are accepted in any particular case is largely a matter of judgment based upon a comparison of these as a whole or an average of the authorities considered the most reliable for modern construction.

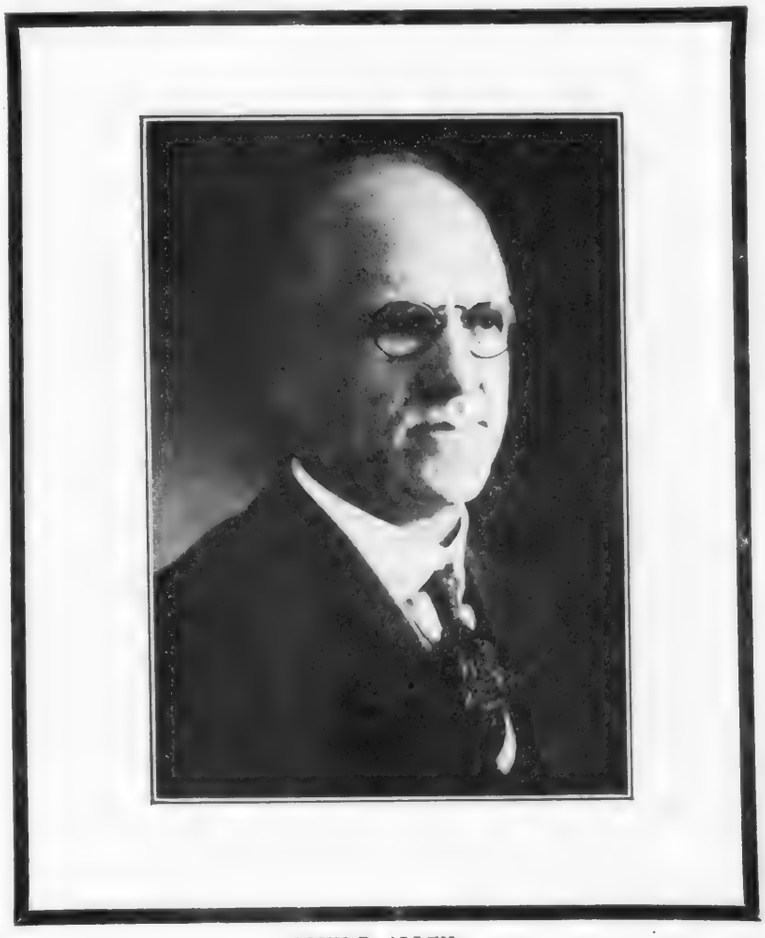
No averages can be made that will be comparative throughout, since so many variables enter in that it is seldom that tests check even with each other. The fact is that for practical use, wall factors do not need to be of great refinement, owing to the larger proportion of glass surface now being used and the relatively greater heat loss of the glass. Therefore, care in computing the window and door areas, the window factor, and the allowance for exposure and leakage, are the more essential items. Outside of making the tables "look right" there does not seem to be any reliable basis upon which to suggest changes.

Taking the figures as they stand, the paper in a frame wall

alone is one of the best heat insulators and better still is the air space. The latter would be omitted if, for comparison, the correspondent's method of eliminating the plastering were considered. But it is not correct to disregard the plastering in comparing these values since the heat loss from any construction is a combination of the several materials entering into such construction and their relation to one another. The loss from the materials assembled as a wall is not the sum of the losses of such materials when considered separately. This is because the loss of heat through a wall takes place in three ways—by leakage, by radiation and by convection. The whole loss is in turn governed by the conduction factor, which, in this case, is the property of transmitting heat through the wall itself, from one surface to the other, by the contact of the particles of the wall with each other.

DEATH OF JOHN R. ALLEN

It is safe to say that the death of no other person could have so shocked the heating world as that of John R. Allen, director of the Research Bureau of The American Society of Heating and Ventilating Engineers, who died of pneumonia in Pittsburgh, October 26. Dr. Allen had suffered an attack of tonsilitis the previous week but his condition was not thought to be dangerous until the day before he died. At that time pneumonia developed and he passed away at 10 P. M., on October 26, before a specialist who had been sent for could help him. The funeral services were held October 27, at his home in Pittsburgh and the body was taken to his former home at Ann Arbor, Mich. for burial. Owing to the short notice of his funeral it was not possible for those living in distant cities to be present. The heating engineers' society was represented by a delegation headed by Professor S. E. Dibble, of Pittsburgh.



JOHN R. ALLEN

Already occupying a place of notable prominence in engineering circles at the time of his appointment as director of the heating engineers' Bureau of Research in 1918, Dr. Allen soon won for himself an esteem and respect that placed him in the unique position of being the leader of his profession in this country. Possessed of a strikingly magnetic personality and favored with the ability to discuss intricate scientific problems in language easy to follow, his leadership was nothing short of an inspiration, and an announcement that he was to address a gathering of engineers was always sufficient in itself to insure a full and eager attendance. His death comes just as the work of the society's Research Bureau in Pittsburgh was beginning to produce important results. It is a satisfaction, however, to know, as Dr. Allen expressed it less than a week before his death, that the work of the bureau is in such shape that it can go on for some time without his directing oversight.

John R. Allen was 51 years old. He was born in Milwaukee. After his graduation from the University of Michigan, in 1892, he began his professional career with the L. K. Comstock Construction Company, remaining with this firm two years. His career during the intervening years until his appointment to the heating engineers' Research Bureau was devoted, with one notable exception, to the training of students in engineering lines, as instructor, assistant professor, junior professor and, finally, professor of mechanical engineering in the University of Michigan. It is well known that since taking up his work in the Research Bureau, Dr. Allen was offered the position of dean of all the engineering schools of the University of Minnesota at a flattering salary and that he turned down the offer through his loyalty to the cause of heating research.

From 1911 to 1913, Professor Allen was engaged in the work of organizing the engineering department of Robert College, in Constantinople, Turkey, as dean of the engineering department. He spent two years in Turkey. On his return to the United States, Professor Allen became head of the Department of Mechanical Engineering at the University of Michigan, resigning in 1917 to accept the place of dean of the College of Engineering and Architecture of the University of Minnesota. He was occupying this position when he accepted the call to become director of the Bureau of Research of the heating engineers' society in April, 1919.

Professor Allen was a a past president of the American Society of Heating and Ventilating Engineers. He was also at the time of his death first vice-president of the American Society of Mechanical Engineers. He was a member of the National District Heating Association and of the British Institution of Heating and Ventilating Engineers. He was about to undertake other important duties as consulting engineer for the ventilation of the New York-New Jersey vehicular tunnel, now under construction.

Professor Allen was a prolific writer on heating subjects and was the author of "Notes on Heating and Ventilation" and "Heat Engines." He was also the co-author, with J. H. Walker, of "Heating and Ventilation," which appeared in 1918. He leaves a wife and daughter.

NATIONAL TRADE EXTENSION BUREAU

Systematizing the Heating Contractor's Desk.

Some good suggestions for the arrangement of a heating contractor's desk are contained in the T. E. B. Monthly Service Bulletin for September. Any plan of desk arrangement, it is pointed out, depends upon the top of the desk being cleared at night, with the exception of the ink well and desk calendar pad. This means providing a place for everything. This holds true, particularly with papers. There should be on the top of the desk only such papers as are necessary for the matter in hand. Other papers scattered over the desk tend to distract one's mind from the matter under consideration.

FOLDERS FOR EVERY SUBJECT.

Folders should be provided for papers on every subject. In this way important papers do not get lost or misplaced. Moreover, if necessary to leave one's desk, it is very easy to slip the papers being used into this folder where they are covered up, so that no important information comes into the possession of outsiders, or those in the office who have no business with such knowledge.

For the office having a bookkeeper and an estimator, or where the contractor does the estimating, a flat top desk is suggested, 60 in. long and 48 in. wide, as shown in the accompanying illustration.

Beginning with the left-hand side, Drawer No. 1, which is the top drawer, is reserved for the "desk organizer," which is shown in the illustration on the top of the desk in the left-hand corner and also in the drawer of the desk, this being done to permit a better view of it. It should always remain in the drawer, as any papers needed can readily be filed in it or taken out. The "desk organizer," as shown, is provided with ten compartments, with a place to insert a label showing the contents of each compartment. It is intended only for papers being held pending a definite decision and care should be taken not to let it become a permanent file.

LABELS FOR "DESK ORGANIZER."

The labels suggested for the different compartments are:

1. Incoming mail.
2. To sign.
3. Immediate attention.
4. To be attended to soon.
5. Material to be ordered.
6. Jobs to be started.
7. Quotations.
8. Monthly statements, list of outstanding accounts, etc.
9. Suspense.
10. Invoices to approve.

It is suggested that whoever opens the mail should put the mail for the attention of the contractor into the first section The contractor, in going over this, will put the various letters in the proper sections. Letters requiring an answer go in the third section, and so on.

When the stenographer has the mail or other papers ready to be signed, she places them in the second section. In this way important letters regarding estimates and other private matters are not left exposed on the top of the desk.

In the third section are placed all other letters and papers that require immediate attention. If for instance, some matter comes to mind requiring the writing of a letter or other action, it may be jotted down on a piece of scratch paper and placed in this section.

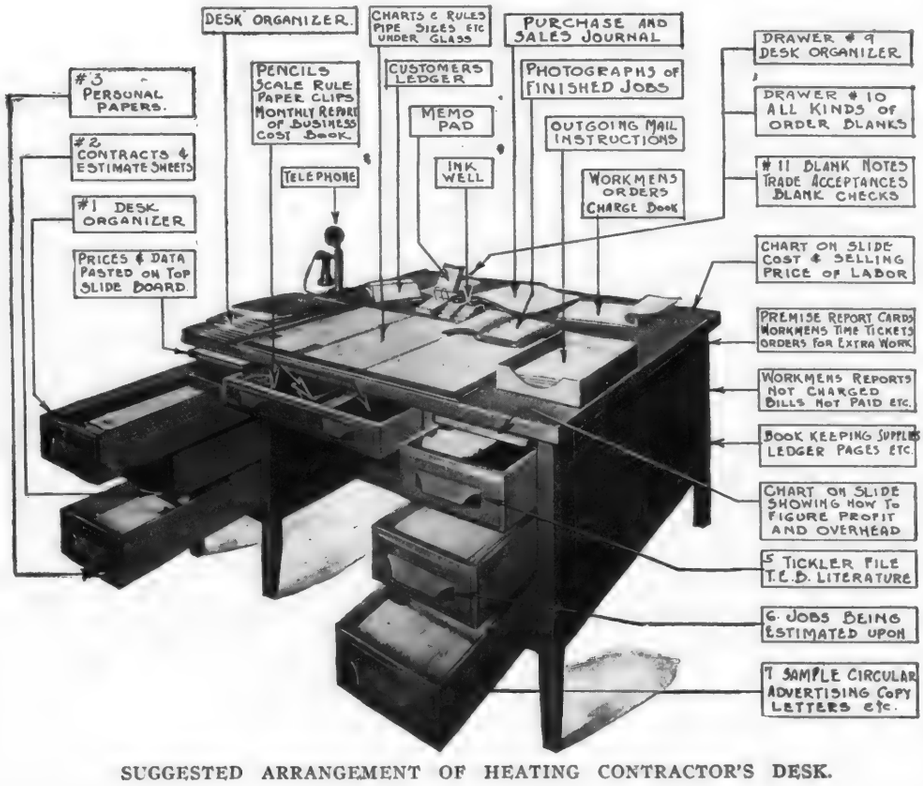
The fourth section takes care of all matters that do not require immediate attention, but which should be attended to as soon as possible. In the fifth section are placed all papers pertaining to material that is to be ordered. These papers should be gone through every day, so as to insure getting orders in on time. Again, with this arrangement, when a salesman calls, it is easy to take out these papers and see if there are any notes concerning material which his house handles and, if so, to obtain prices upon the requirements.

The sixth section is for papers regarding jobs that are to be started. Whenever it is necessary to lay out work for the journeymen, the papers in this section will serve as a guide in the placing of the men.

In the seventh section are placed copies of requests for quotations or any letters written or received regarding quotations which are likely to come up for attention in the near future.

In the eighth section should be kept all the monthly statements which the bookkeeper furnishes regarding the condition of the business. This will include a list of all outstanding accounts. By making monthly comparison of these lists it will be possible to see in what departments the business is making progress and where no progress is being made.

The ninth section is for papers concerning matters not covered by the preceding sections, which may be needed at an early date. Finally, the tenth section should contain all invoices that are to be approved before being sent out.


DESK ORGANIZER.
CHARTS & RULES PIPE SIZES ETC UNDER GLASS
PURCHASE AND SALES JOURNAL
#3 PERSONAL PAPERS.
PENCILS SCALE RULE PAPER CLIPS MONTHLY REPRT OF BUSINESS COST BOOK
CUSTOMERS LEDGER
PHOTOGRAPHS OF FINISHED JOBS
#2 CONTRACTS & ESTIMATE SHEETS
MEMO PAD
OUTGOING MAIL INSTRUCTIONS
TELEPHONE
INK WELL
WORKMENS ORDERS CHARGE BOOK
#1 DESK ORGANIZER
PRICES & DATA PASTED ON TOP SLIDE BOARD
DRAWER # 9 DESK ORGANIZER
DRAWER # 10 ALL KINDS OF ORDER BLANKS
11 BLANK NOTES TRADE ACCEPTANCES BLANK CHECKS
CHART ON SLIDE COST & SELLING PRICE OF LABOR
PREMISE REPORT CARDS WORKMENS TIME TICKETS ORDERS FOR EXTRA WORK
WORKMENS REPORTS NOT CHARGED BILLS NOT PAID ETC.
BOOK KEEPING SUPPLIES LEDGER PAGES ETC.
CHART ON SLIDE SHOWING HOW TO FIGURE PROFIT AND OVERHEAD
5 TICKLER FILE T.E.B. LITERATURE
6 JOBS BEING ESTIMATED UPON
7 SAMPLE CIRCULAR ADVERTISING COPY LETTERS etc.

SUGGESTED ARRANGEMENT OF HEATING CONTRACTOR'S DESK.

OTHER LEFT-HAND DRAWERS.

Drawer No. 2, which is the middle drawer on the left-hand side, is intended for estimating and contract forms. A legal- sizefolder can be had with from 26 to 31 divisions. This folder is 15 in. long by 9½ in. wide. It is not quite as wide as the estimating forms, but has been found very useful in this connection. In the same folder will be the contract forms so that one can go right through, make up all the figures on an estimate, and select the proper form of contract for the stenographer to fill in. Drawer No. 3, on the left, is left open for personal papers.

The wide drawer in the middle of the desk serves the usual purpose of being a receptacle for all desk tools, such as pencils, slide rule, scale rule, pen-holders, pens, rubber bands, clips, eraser, etc. A tray with suitable divisions can be bought

for these, or small paper boxes can be used, being held in place by thumb tacks thrust through the bottom of the box into the drawer bottom. Beside the trays, space is left for the pricebook, while scrap paper and scratch pads can be placed back of these.

ARRANGEMENT OF RIGHT-HAND DRAWERS.

Turning to the right-hand side, the top drawer is reserved for a tickler file and T. E. B. literature. The tickler file is a small box, large enough to hold a card 5 in. wide by 3 in high This box, with 31 guide cards, one for each day of the month, and 12 more for each month of the year, can be obtained at almost any stationery store.

In the use of this tickler, a small scratch pad, no larger than 3 in. x 5 in. should always be carried in the pocket. When making an oppointment for a certain day, it should be jotted down on one of these sheets. A separate sheet should be used for each different date. When returning to the office, get out your pad, tear off the sheets, and file them behind the guide corresponding to the date noted. Each morning the slips behind the card for that date should be taken out, leaving before you the things to be attended to that day.

To illustrate the operation of the tickler an instance is cited where the contractor learns, say, that figures on a new office building to be erected must be in by the 10th of the month. A note is made on the scratch pad to that effect and it is filed in the tickler behind "7." On the morning of the seventh, it will automatically come up for attention, and if necessary, can again be filed for the next day and forgotten until that time.

KEEPING TAB ON DIFFERENT DEPARTMENTS.

In the back of the daily tickler file it is suggested that there should be included a set of guide cards covering the various departments of the business, such as bookkeeping, advertising, show-window, showroom, shop equipment, shop practice and various other items. There should be a blank card behind each of these guides. On this card may be made a notation of the page number and date of the T. E. B. Monthly Bulletin containing articles covering various subjects. This same index can also be used for keeping track in the same way of articles in the trade journals.

Drawer No. 6 is designed to hold the folders covering jobs requiring estimates. A separate folder is urged for each job, although small jobs can be kept in an envelope. By putting a partition across the drawer in front, and leaving a space of 3 in. or 4 in. for such small jobs as are being carried in envelopes, the folders can lie flat in the back part of the drawer. This drawer should not be used as a permanent file for estimates, as all estimates and contracts should be kept in the safe after the contract is secured.

Drawer No. 7 may be devoted to suggestions for advertising copy.

PUTTING THE TOP OF THE DESK TO USE.

The top of the desk and the two slide boards can also be put to good use, other than the usual uses. One of the suggestions offered is for a glass top, 20 in. x 30 in., with a frame around it. Under this may be placed various heating data and other matter. Also, on each of the desk slides may be pasted prices and data as to pipe sizes, etc., and methods for figuring profit and "overhead."

THE BOOKKEEPER'S DESK.

In the illustration, the opposite side of the desk is arranged for the use of the bookkeeper. It will be seen that Drawer No. 10, which is the second drawer on the bookkeeper's right, is for a supply of all blank forms needed, such as credit memos, material and delivery tickets, workman orders, and invoices. Drawer No. 11 may be divided into compartments and reserved for blank notes, trade acceptances and blank checks.

Drawer No. 12, the top drawer on the bookkeeper's left, should have a stock of "premise report" cards, workmen's daily time cards and orders for extra work, all of which are published by the National Trade Extension Bureau.

Drawer No. 13 may contain workmen's reports that have not been charged on the books, and invoices from the supply houses that are to be paid. These invoices should be filed away in a separate folder and the date on which each invoice has to be paid to secure the cash discount should be plainly marked on the invoice. The bookkeeper should look through the folder every morning and take out the invoices for which checks must be mailed that day.

Drawer No. 14 is for the other bookkeeping supplies, such as ledger sheets, etc. On the slide boards of the bookkeeper's desk can be pasted the cost and selling prices on articles that are sold most frequently, such as pipe and fittings. These cost figures can be in code. The code suggested as the best is the 100% list which is double the cost. The selling price, of course, need not be in code.

The daily calendar pad on top of the desk should be used in the same way as the daily tickler described for the use of the contractor. The books of account, such as daily job record file, journal binder and ledger binders are kept in the safe when not being used. In the illustration they are shown on top of the desk. A telephone memorandum pad should likewise be kept on top of the desk during the day, where information connected with telephone calls may be jotted down. At night this pad should be put away in Drawer No. 8.

On top of the desk also should be a wooden tray or wire basket similar to the one illustrated. In this the contractor puts such papers as he wishes to go to others in the office. The bookkeeper takes these papers, setting aside those for himself and passing on the others. At night this box will fit into Drawer No. 9, on top of the desk organizer.

WHEN WILL BUILDING COSTS BE LOWER?

EDITOR'S NOTE—*Although the study presented herewith was made last March, the authors note the fact that the situation has not changed materially since that time.*

In a study of building conditions, made for the George A. Fuller Company by the Fuller Industrial Engineering Corporation, the situation is summed up in the statement that there are three conditions which might bring about a reduction in building costs:

1. A reduction in demand.
2. A reduction in wages of labor.
3. A reduction in price of building materials.

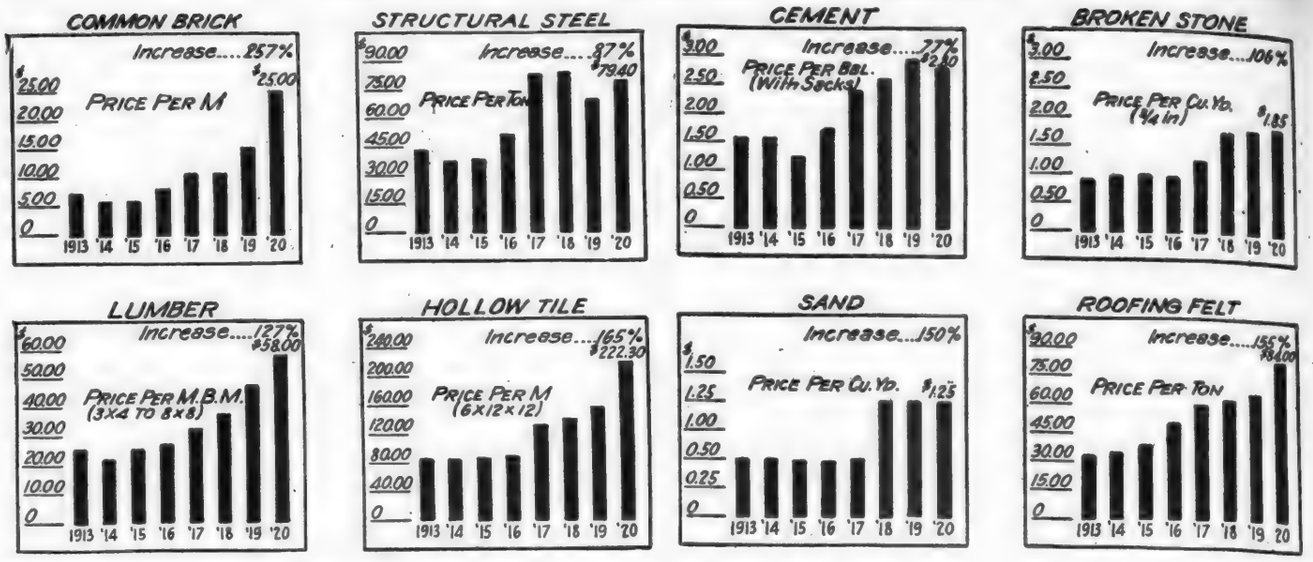
A reduction in the demand for additional construction is highly improbable, in view of the present shortage of building space which has resulted from a slowing down of commercial and industrial building during the period of the war.

An inspection of the accompanying figures will bring out clearly the fact that the country at large is short about three and a half billion dollars' worth of normal building construction, and until this shortage is made up there will surely be continued and increasing demand for space.

As to the hope for a reduction in building costs due to a reduction in wages paid to labor, it does not seem probable that the laboring man will be content to accept any reduction in the size of his pay envelope. His attitude is rather to force wages to higher planes, and an inspection of the diagrams which follow will show that the wages of the building trades throughout the United States, as well as in New York City, have risen steadily during the past seven years. Still labor is dissatisfied and restless. The hope for a reduction in the cost of building materials rests very largely on the hope for a reduction in wages, because, for every dollar spent for brick, cement or steel which goes into a building, from 85% to 90% of such price ultimately goes back to the laborer who dug the clay, mined the coal, burned the brick, ground the cement, rolled the steel, and transported all of them over railroad lines to the site of the work and built them into the structure. Until these related wages go down, therefore, it is not reasonable to expect any substantial reduction in the price of building materials.

Some idea of the increase in the prices of the principal building materials during the past seven years is given by diagrams on following pages. That this increase is by no means at an end is evidenced by the increase in prices of these materials since the first of January, 1920. In New York, the price of brick has risen from $25 to $33 per thousand; lumber from $58 to $72 per thousand feet, B. M.; steel from $95 to $135 per ton; and other materials in like manner.

In view of the building shortage in the



SPRING PRICES OF BUILDING MATERIALS IN NEW YORK CITY FROM 1913 TO 1920.

United States, there seems little hope for a reduction in building costs due to reduced demand. With the present attitude of labor, there seems less chance for a reduction in building costs due to lower wages; and with this same attitude affecting 90% of the cost of building materials there seems small chance for a reduction in the price of building materials. The country is so far underbuilt that prices have become subsidiary to necessity.

We know of no other major influence which can bring a marked or immediate reduction in building costs, and our mature judgment is that there will be no substantial reduction for several years to come.

Our advice to our clients, in view of this whole situation, is that if they need additional building facilities, and the conditions of their business justify the expenditure, it is far wiser to build now and enjoy the benefit of the improvements than to wait and lose the use of this money-making space for several years, and then build at costs which may be even higher than those of the present time.

THE BUILDING SHORTAGE IN THE UNITED STATES.

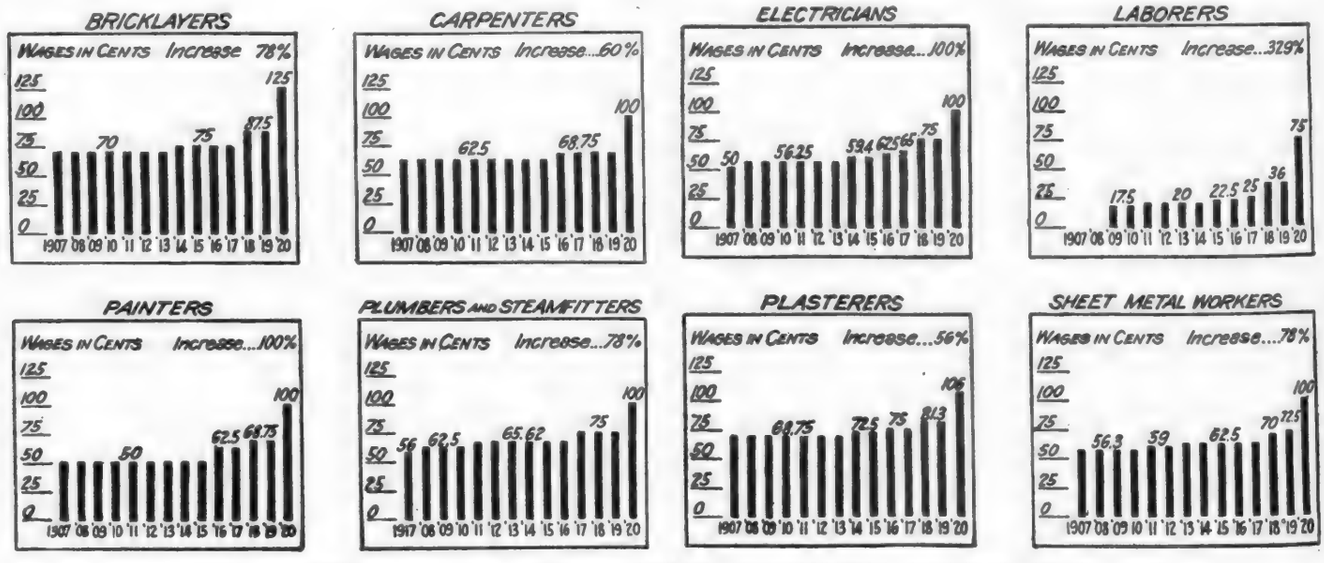
The records of new building construction in the cities of the United States, from 1911 to 1919, inclusive, as published by Forbes Magazine, show the following figures:

Year	Cost of Building Constructed	Average Cost per Sq. Ft.	Square Ft. Built
1911	$962,499,700	$1.59	605,300,000
1912	1,027,515,200	1.63	630,400,000
1913	980,971,600	1.61	609,300,000
1914	891,845,500	1.55	575,400,000
1915	931,937,300	1.52	613,100,000
1916	1,137,160,900	1.82	642,800,000
1917	816,941,000	2.27	358,500,000
1918	492,163,900	2.65	185,700,000
1919	1,467,821,300	3.20	458,600,000

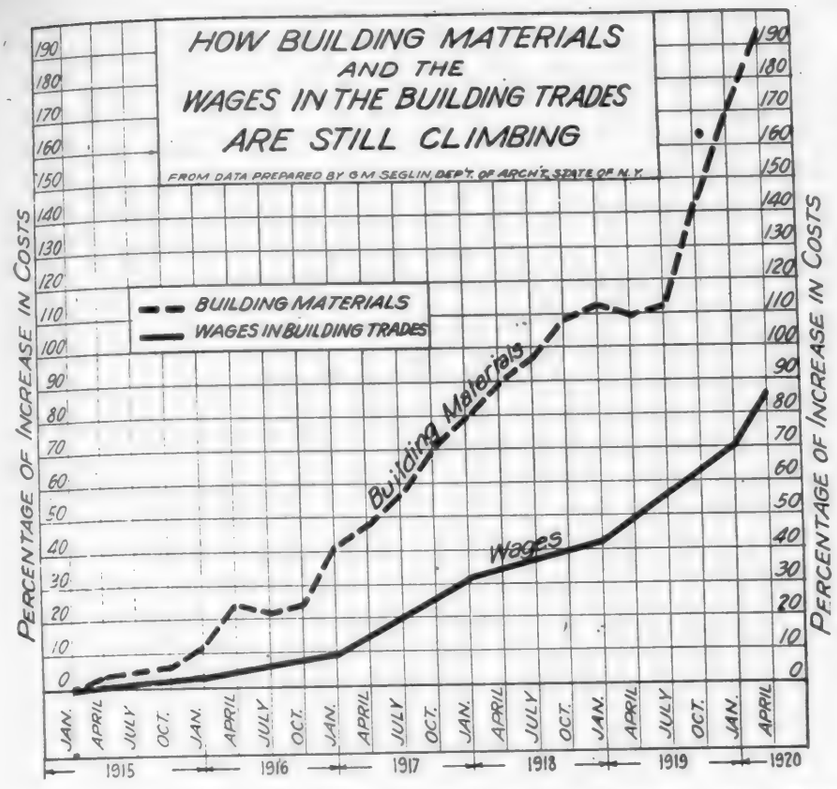
The low average cost per square foot of building constructed, shown in the above table, is due to the high percentage of floor space which consists of the cheapest kind of factory construction, amounting to little more than sheds. The average cost per square foot of modern factories of reinforced concrete, or other fireproof material, as well as of first-class office buildings and hotels, is much higher, the range being from $3.50 to $10.50 per square foot, depending upon the character of structure and its location.

For the years 1911 to 1914, inclusive, the estimated average amount of new building was equivalent to 605,100,000 sq. ft. of floor space per annum. In 1918 less than one-third of this amount was done, and, even in 1919, in spite of the large money expenditure, the amount of building done was 146,500,000 sq. ft. below this figure. Hence it is clear that ever since the end of 1916 the available building space has been running further and further behind requirements.

Owing to the increase in population, at least 10% more floor space is required to be built annually than before the war. Otherwise expressed, we ought to have built about 650,000,000 sq. ft. annually during the past three years, or 1,950,000,000 sq. ft. in all. We actually built only about 1,002,800,000 sq. ft. and this leaves a shortage of 947,200,000 sq. ft. At the present time, we are building at the rate of about 550,000,000 sq. ft. per annum.



HOURLY WAGES OF PRINCIPAL BUILDING TRADES IN NEW YORK CITY FROM 1907 TO 1920.


HOW BUILDING MATERIALS AND THE WAGES IN THE BUILDING TRADES ARE STILL CLIMBING
FROM DATA PREPARED BY G.M. SEGLIN, DEP'T. OF ARCH'T. STATE OF N.Y.
BUILDING MATERIALS
WAGES IN BUILDING TRADES
Building Materials
Wages
PERCENTAGE OF INCREASE IN COSTS
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1915 1916 1917 1918 1919 1920

Thus we see that in order to make up during this present year the existing shortage of housing space we would have to construct dwellings, factories and offices having an aggregate floor space of about 1,597,200,000 sq. ft. or almost as much as we ever built in any three past years.

The chart reproduced above illustrates graphically the normal building requirements in the United States from 1911 to the end of 1919, the actual building operations completed during those years and the resulting shortage which this country is now facing. It appears, therefore, that we are about 18 to 21 months behind in our building program, and that the total amount of building operations during the next few years must not only rise to the average normal yearly requirements but must exceed those requirements sufficiently to make up the shortage which accumulated during the past three years. With this shortage to be overcome, there is no likelihood of a decrease in building operations, but on the contrary there is every reason to expect an increasing demand for some years to come.

HOW LONG WILL THE HIGH COST OF BUILDING CONTINUE.

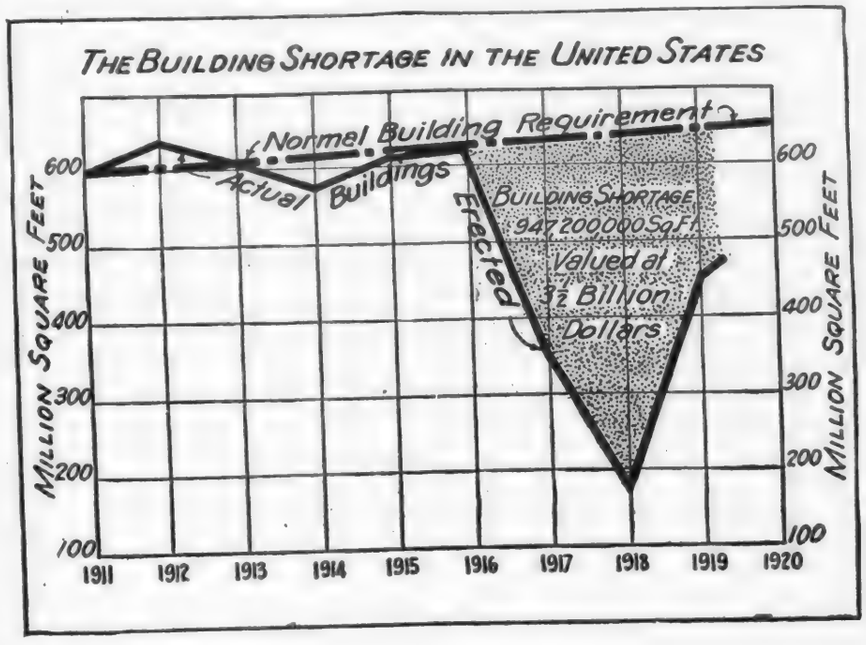
The prices of building materials and labor are controlled by economic law—supply and demand. The present abnormal demand for building materials is due to curtailment in the normal amount of building during the war; to a 10% increase in population since the war began; to a shifting of population from rural to urban centres, where thousands of men and women were attracted by war wages, which have increased, in many cases, since the war ended.

The labor shortage is due to the practical suspension of immigration since 1914; in a small measure to the return of foreign workmen to their own countries; to the stimulation of all manufacturing industries brought about by war conditions abroad; and very largely to the development in this country of entirely new industries, on a very large scale, such as dye manufacturing and ship building.

Authorities agree that high building costs will continue for some time. They recognize, however, that any general financial depression will ultimately affect the cost of materials and labor, but feel that the decline in building costs will be small, and slow to follow the downward trend of other commodities, because of the great demand for building space which must continue until the shortage due to the war has been eliminated.

None of them anticipates a return to the low pre-war levels, and far-sighted executives are perfecting their plans and having exhaustive engineering reports made for the betterment of conditions in their factories, so that they can immediately take advantage of any lower costs which may momentarily prevail during the period of readjustment.

Many manufacturers, who see in the present prices obtained for their products an opportunity to write off the increased cost of new building, are going forward with their construction work, and are thus relieving their cramped factory conditions, securing greater production and lowering factory casts.



Suggestions for Solving the Construction Problem.

Based on the answers to a series of questions sent out to their members, the Associated General Contractors have offered the following suggestions to the Senate Committee on Reconstruction and Production:

1. Immediate encouragement of desirable immigration through some selective plan which includes also adequate supervision of distribution, assimilation, and naturalization.

2. Extensive government aid to trade schools to train apprentices in a sufficiently wide enough range of related subjects to enable them to adjust themselves to changes in industrial conditions and seasonal demands of the construction industry.

3. A system of government courts to handle industrial disputes, adequate enough to give prompt awards and endowed with power to enforce those awards.

4. Government encouragement to a national conference of construction employers, employees, and other related interests

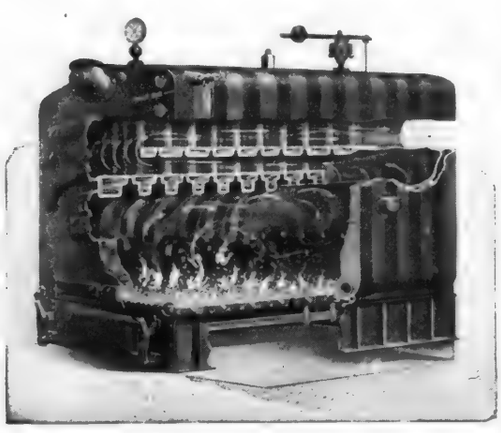
PRESENT STATE OF THE ART IN SMOKELESS BOILER CONSTRUCTION

No. 5—Ideal Smokeless Boilers.

The American Radiator Company is now manufacturing three types of cast-iron smokeless boilers, namely,—the familiar Ideal down-draft double-grate boiler, the unique Ideal Type "C" grateless cross-draft boiler for lignite and free-burning coal, and the Ideal smokeless up-draft boiler for any kind or grade of coal. The first of these is so well known that little need be said of it other than that its popularity is such that the demand exceeds the supply.

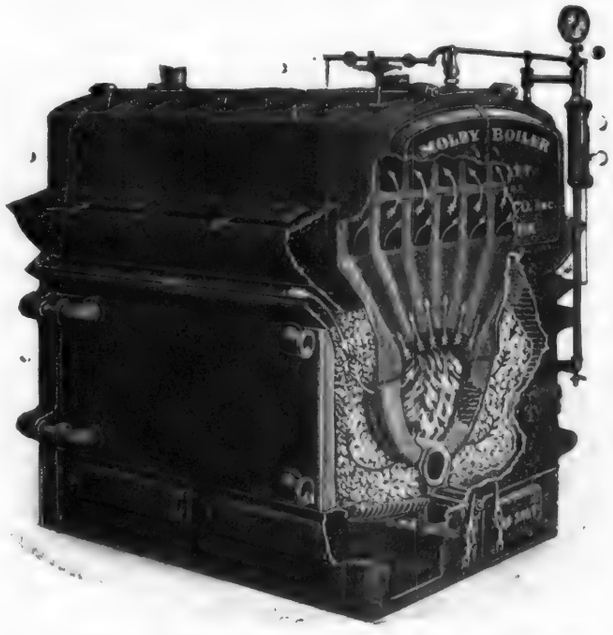
The Ideal Type "C" boiler is unique in that no grates are necessary. Its rapid and increasing sale in the western and northwestern States is evidence that it fills a long-felt want for some boiler which will burn the crumbly lignite smokelessly and efficiently. Whereas in all boilers with grates it is impossible to burn this fuel without a large share sifting through the grates unburned, in this boiler this powdery action is beneficial rather than a hindrance, because it facilitates the flow of the coal downward from the magazine into the fire zone.

The Ideal smokeless up-draft boiler, as illustrated, is of the cast-iron tubular type. Smoke is prevented by introducing a uniform stream of preheated air across the back of the fire chamber. All incandescent combustible matter and partly burned gases pass this point on their way to the two upper galleries of flues. Mixing with this high temperature air, issuing from a heavy cast-iron secondary air tube, further combustion takes place. The carbon particles burn and the partly oxidized gases complete their combustion with the result that the boiler is smokeless even when burning coals rich in oil and other smoke-making ingredients. After passing this point the gases rise into the lower gallery of flues and pass to the front of the boiler. Next they rise and pass to the rear and out through a duplicate gallery filled with short vertical water tubes. The tubular arrangement and the vast amount of heating surface, makes this boiler a rapid steamer and permits of very high thermal efficiencies being obtained.



IDEAL SMOKELESS UP-DRAFT BOILER.

As a further aid to economy and to reduce the care required to a minimum, a unique system of draft control is used. Chains from the regulator to the draft and check doors are done away with. These had been found both troublesome to the fireman and unsatisfactory because of pulley friction, stretching and unfastening at the doors, etc. In this boiler one straight rod replaces all chains. The draft door is moved from the ash door to the rear of the boiler directly under the smokehood. In this way the one vertical rod, operated by a seamless brass bellows Sylphon regulator, has been found to serve better than any combination of chains, pulleys, bell crank or other device.



MOLBY DOWN-DRAFT MAGAZINE-FEED BOILER.

No. 6—Molby Magazine-Feed Boiler.

In burning the gases and the smoke carbon released from coal by heat, it is necessary that these gases and smoke carbon pass into continuous higher temperature, instead of passing into lower temperature. Proper combustion can only take place when gas and oxygen are mixed at high temperature. In the down-draft type of boiler these gases are drawn downward and through the fire and are carried into a combustion chamber, together with the oxygen from the draft, both at a high temperature. Combustion takes place because of the mixture of this gas and oxygen, at a proper temperature, in a combustion chamber protected against cooling draft. The smoke carbon and gas from the fuel are carried downward through the body of the fire. The body of coal and unburned coal are on the draft side of the fire.

In the so-called up-draft boiler, the fuel is fed on the chimney side of the fire so that when the gases and smoke carbon are released by heat they pass into a lower temperature which may easily be insufficient for combustion. In that case, they pass to the chimney wasted heat. By the down-draft principle high efficiency may be obtained, saving a large percentage of fuel and giving practically smokeless combustion.

The construction of the Molby boiler is arranged to take advantage of the true combustion principle. Referring to the accompanying illustration it will be seen that this construction meets the conditions for smokeless combustion, protecting the combustion chamber from lower temperature at all times, as the fire is always carried at or above the top of the gas ports. The magazine feature of this boiler and the fact that the fire pot is wider at the bottom than at the top insures the feeding of coal to the fire by gravity as required, and the carrying of fire for long periods. The ashes accumulated from the fire deposit on the grate through which they can be easily removed. As the draft comes from above, the ashes do not stop the draft. There is also an additional quantity of air furnished for combustion which passes through the base and the lower strata of fire and mixes with the gas and oxygen from above at the entrance to the combustion chamber, furnishing a hot blast jet at the point of combustion.

Oxygen being necessary for combustion a proper chimney is necessary to furnish that oxygen. The draft through a down-draft boiler is constant, having at all times the same resistance to draft, that is, the same quantity of coal and fire. The chimney should be sufficient to overcome this resistance and should be tight.

In magazine-feed low-pressure boilers only a free-burning type of bituminous

coal should be used, as a caking coal cannot be properly handled, owing to the depth of fire. The Molby boiler also burns efficiently the various grades of anthracite coal. It is manufactured by the Molby Boiler Co., New York.

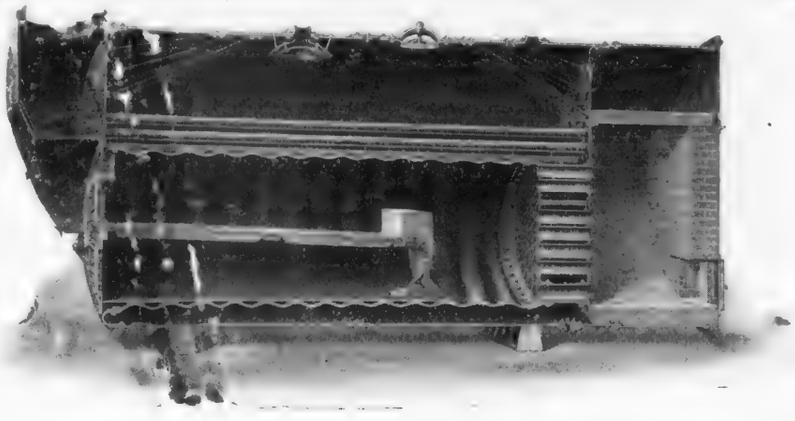
No. 7—Murray Duplex Internally-Fired Boiler.

Perhaps the most remarkable thing regarding the Murray Duplex boiler, manufactured by the Murray Iron Works, Burlington, Ia., is that it was not designed as a smokeless boiler. It was discovered, however, that the breaking up of the gases in passing through the tubes in the rear of the furnace and the reignition of the gases at that point, made the boiler practically smokeless.

This boiler is of the self-contained Scotch type, with a plain cylindrical shell. With this arrangement all the heat from the combustion of the fuel is inside the boiler and there is no danger of radiation outward through cracked walls or of leaks of cool air inward. The furnace itself is also cylindrical and is either of the Adamson or corrugated type, depending on the pressure to be carried.

The tubes are streight and are set in two nests, the upper long ones reaching from front to back head and the lower short ones from the rear head of the furnace to the combustion chamber.

The patented features of the boiler are the shortening of the furnace by the insertion of a head and the use of tubes connecting this head to the combustion chamber. The object of this arrangement is to divert the flames downward, and to heat the rear and lower portions of the boiler. This design serves to increase the circulation of the water and, consequently, the steaming capacity of the boiler. At the same time unequal expansion and contraction of the shell is prevented.



MURRAY DUPLEX INTERNALLY-FIRED SMOKELESS BOILER.

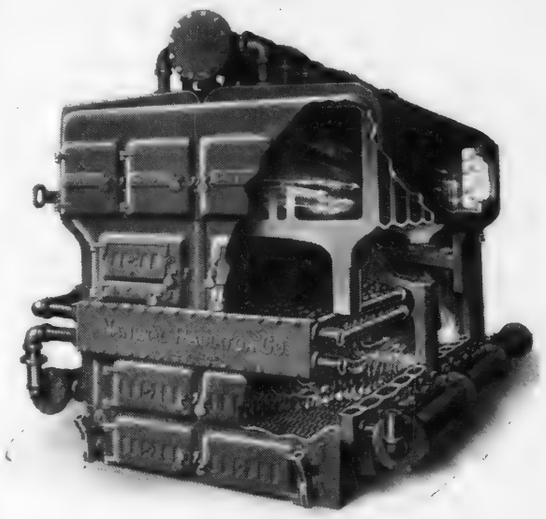
The head in the furnace and lower tubes accomplish two other results which the manufacturers consider almost as desirable as improved circulation, in that they hold the heat in the furnace where it is surrounded by water and also cause a mixing of the gases in passing through the lower tubes, causing more complete combustion and giving the boiler its smokeless feature. They are built in sizes ranging from 8 to 250 h. p., and for all pressures from 100 to 200 lbs.

No. 8—National Smokeless Boiler.

With its Hawley type of removable grate, a secondary chamber of ample size for the combustion of gases, water-tube type of flue construction, and ample steam space, the National down-draft smokeless boiler is described as one that cannot be classed with "competition" boilers. Each section is divided into two parts, with headers of ample size into which all sections are connected. This arrangement permits any section to be taken out at any point and replaced without disturbing the balance of the boiler. The header is a 10-in. manifold providing additional steam space. All connections are of the flange type.

The upper or Hawley type of water grate used with this boiler is made of extra-heavy wrought-iron pipe, while the lower or secondary grate is of standard construction. The upper is a removable water-tube grate assembled in a series of units and connected into a header which is part of the front of the boiler. All grate units work independently of each other and each unit is connected to the grate header by means of a slip nipple and held in place by top and bottom bolt connections, entirely outside of the fire chamber. To renew any unit it is only necessary to disconnect these bolts and renew the unit through the fire chamber. If desired, any part or the entire grate can be removed and replaced without disturbing the balance of the boiler. It is stated that the boiler will burn any grade of soft coal.

The manufacturers emphasize the point that no feature has been sacrificed in the design of this boiler in order to reduce weights and manufacturing costs. The same proportion of grate surface to heating surface and the same heating surface to horse-power is used as is found in tubular boilers. Provisions have also been made for burning the proper amount of fuel per square foot of grate per hour, the factor to develop full rated capacity or overload with economy.



NATIONAL SMOKELESS BOILER.

Hardwood Equal to Coal in Heating Value.

As the result of extensive tests made by the forestry department of the United States Department of Agriculture on the value of wood as a heat-producing substance, the department has announced that a ton of good coal is merely the equal of a cord of hickory, oak, elm, maple or ash for heating purposes. Where resinous woods are used, they have a heating value of 1½ tons of coal.

In Iowa, according to Professor G. B. McDonald, of the forestry section of Iowa State College, about 1,500,000 cords of wood are used yearly for heating, and during the war, when coal was scarce, these figures ran up to 3,000,000 cords.

Another Ventilation Fallacy Spiked.

"One of the most mischievous notions that ever found a place in the theories about school ventilation," writes Jacques W. Redway, F. R. G. S. of the Meteorological Laboratory at Mount Vernon, N. Y., in the *American School Board Journal*, "is now going the rounds. It assumes as a fact that the air of schoolrooms is thoroughly impure and vitiated; but declares that, if the air is kept in motion, all the badness is taken out of it. A more idiotic notion could not be conceived. A slight stirring of bad air certainly takes away a lot of the discomfort that it carries when still. Because it stimulates evaporation from the skin it is refreshing. But stirring bad air does not make it pure and wholesome; and why school-

men who are quoted as educational authorities should hand out such senseless piffle is intelligible perhaps to themselves, but not to anyone else. Incidentally, no harm comes from keeping ordinarily pure air in motion."

Industrial Peace in the Building Trades.

In the opinion of a writer in the National Civic Federation Review, W. C. Roberts, no greater promise of industrial peace has been made in the United States than that engineered by the Building Trades Department of the American Federation of Labor for the building industry. The writer points out that it has been impossible heretofore to tell with exactness where one trade begins and another ends because of the elimination of skilled workmen. Trades are sometimes wiped out by the elimination of skill. The extent of the twilight zones is so great that one is continually enroaching on the other. This has caused innumerable strikes.

A twelve years' campaign to bring about a solution of this situation has resulted in the formation of a National Board for Jurisdictional Awards in the Building Industry. The employees through their unions and the employers, architects, engineers and others, through their associations, have joined hands and declared that they are determined to eliminate all unnecessary strife. A constitution has been adopted by the board which proposes conciliation and arbitration, instead of strikes.

While the organization was brought into existence March 3, 1919, it is just beginning to function successfully. It consists of eight members. Three are selected by the Building Trades Department and one each by the American Institute of Architects, Engineering Council, the National Association of Building Trades Employers and two from the Associated General Contractors of America. The members of the National Board are E. J. Russell, chairman, American Institute of Architects; R. P. Miller, Engineering Council; Col. J. R. Wiggins and F. J. C. Dresser, Associated General Contractors of America; E. M. Craig, National Association Building Trades Employers; William Dobson, William L. Hutcheson and John J. Hynes, Building Trades Department, American Federation of Labor. Wm. J. Spencer is executive secretary.

Among the provisions in the constitution that give promise that the campaign for peace in all building industries will be successful are:

The duties of the board shall be to hear claims for jurisdiction over work performed by Building Trades; and to determine by which trade the work in contention shall be performed and to make an award in conformity with the facts submitted by the contendents. At least a two-thirds majority of the voting members of the full board shall be required to render an award in all cases.

The board shall have the power to investigate all disputes and to make awards in accordance with its findings, as hereafter provided.

Should the board fail to make an award an umpire may be agreed upon whose findings shall be final. Should the board, by a two-thirds majority, be unable to agree upon an umpire, the Secretary of the U. S. Department of Labor shall be called upon to name the umpire.

When a dispute arises the employer to whom the work has been given shall proceed with such workmen as in his judgment he may see fit to employ pending a decision by the board; but the right of any contestant to dispute shall not be prejudiced in its claim for a final award.

Each signatory to this agreement hereby agrees that the membership of that organization shall not take part in sympathetic strikes in any case of jurisdictional dispute.

Labor organizations signatory to this agreement shall secure the enforcement and compliance of their organizations with the provisions of this agreement and the awards of the board.

Local organizations refusing compliance with the provisions of this agreement and the wards of this board shall be suspended from their International organization and the international organization shall proceed at once to man the job and the employer shall co-operate with the International organization in so doing.

Any architect, engineer or employer represented on this board through an organization signatory to this agreement shall be suspended from his organization or organizations upon failure to comply with the provisions of this agreement and the wards of this board.

The decisions shall govern the architects and engineers in writing specifications and the contractors in awarding contracts.

The board shall certify its awards to the officials of each of the organizations, parties hereto.

It shall be the duty of the officials of affiliated bodies, upon receiving such information, to instruct its members to carry out the decisions of the board and to use them as a guide in the conduct of their work.

In order to avert jurisdictional strife it is the recommendation of the board that new materials, specialties and methods of application shall be passed upon by the board before being specified or used provided that six members of the board shall have agreed that the subject has not been previously covered.

No member representing the Building Trades Department shall vote on an award in a dispute in which his own craft is involved nor shall any member employing one trade exclusively vote on any award in which that trade is a party at interest.

The penalties for non-compliance with the awards is believed to be of sufficient influence to prevent refusal to accept them. A union that fails to abide by an award is suspended from its national or international union and its members would therefore be unable to work at their trade on any building in the place where the trouble occurred.

To Test Coal Ashes in New York City.

A campaign has been inaugurated in New York City to check coal waste by an analysis of coal ashes, especially those of public service corporations, in an effort to ascertain how much coal is not consumed in the municipal boilers. The work will be undertaken by the city's central testing laboratory. This action followed publication of a statement by Maurice E. Connolly, Borough President of Queens, that analysis of ashes received in his borough for road construction, which had been carted from the Interborough's power plant at 59th Street, Manhattan, showed that 44.8% of the ashes were unconsumed. The Interborough issued a statement that only 3.5% of its coal is unconsumed.

President Connolly also said that if the company uses 2000 tons a day—those are the figures supplied by the Interborough—and if the loss in coal is only 5%, it would mean 100 tons a day. This, at $12.25 a ton, which the company now is paying, would be $1,225 a day, or $446,125 loss for 365 working days.

New Publications.

EMISSIVITY OF HEAT FROM VARIOUS SURFACES, by V. S. Day, research assistant, has recently been published by the University of Illinois Experiment Station as Bulletin 117. It is a second report of progress under the present co-operative agreement between the National Warm-Air Heating and Ventilating Association and the University of Illinois for an investigation of warm-air furnaces and furnace heating systems. The bulletin deals principally with an investigation of the value of insulating materials commonly employed in warm-air furnace installations, as affecting the economy of the system.

Perhaps the most important result of these tests is the convincing evidence which they present as an argument against the use of thin layers of asbestos paper covering on bright tin pipes. The heat loss was 39% greater with one thickness of paper than without. This excess loss represents a waste of 5% or more of the coal consumed in the average house furnace. The conclusion is therefore drawn that "unless the insulation excels the uncovered bright tin in heat insulation properties it should not be used." The tests have also shown that superior methods of heat insulation are available.

The results of the tests are convincingly illustrated by diagrams and tables. Size 6 x 9 in. Pp. 39.

BITUMINOUS COAL STORAGE PRACTICE by Professor H. H. Stoeck, C. W. Hippard and W. D. Lantry, is discussed in a timely manual fresh from the press of the Experiment Station of the Uni-

versity of Illinois. It is published as Bulletin 116 and supplements and brings up to date the matter contained in Circular No. 6 of the Experiment Station, entitled "The Storage of Bituminous Coal," issued in 1918.

In these days of high labor costs and car shortages it has become more important than ever before to maintain a steady flow of coal from the mines to the consumer. One of the factors contributing to fuel shortages in recent years has been the inability of existing transportation systems to handle a greatly increased winter tonnage of fuel, when already overloaded by abnormally heavy tonnage from other sources.

The natural remedy for this condition would apparently be the handling of as large a proportion as possible of the total fuel tonnage during those months of the year when traffic conditions are not so acute. If this is done, it then becomes necessary to store large quantities of fuel at or near the point of use.

When quantities of bituminous coal have been stored, more or less trouble has been experienced from fires, due to the spontaneous combustion of the fuel; in the past this fact has prevented to a large extent the practise of fuel storage on any considerable scale. Now that it has become imperative to store coal, a more particular study of the causes of spontaneous combustion in coal piles has been made. While it cannot be said that the problem is fully solved, yet it has been possible to evolve rules of practice in storing bituminous coal that will greatly reduce the liability to fire.

Considerable space in the bulletin is devoted to actual experience with storage piles, and where fires have occurred the cause or causes have been carefully studied and reported on. The results of these investigations give a prospective storer of coal definite information on what to do and what to avoid in storing. Size 6 x 9 in. Pp. 157.

New Plant Marks the Remarkable Growth of the Ilg Electric Ventilating Company.

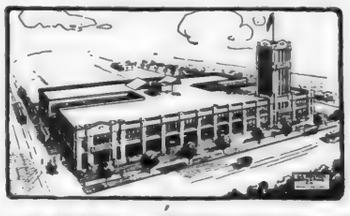
A landmark was reached by the Ilg Electric Ventilating Company, of Chicago, when it moved into its new plant at 2850 Crawford Avenue, Chicago, in October. The rapid growth of this company which necessitated the building of this new plant, in spite of high costs, etc., makes interesting reading.

The company was organized in 1906, its first place of business being at 21 East Kinzie Street, where the company occupied two floors. In 1910 the company moved to Whiting and Wells Street, occupying a new six-story building, 50 ft. x 100 ft., known as building A.

The next advance was made in 1914 when a seven-story building, 50 x 100 ft., was erected, known as building B. This building doubled the company's manufacturing space. Building C 25 ft. x 125 ft., was built in 1917.

The new plant at 2850 Crawford Avenue, between Diversey Avenue and George Street, was designed in 1919 and was started in November of last year. Various strikes and a shortage of material delayed completion until October of this year. It is of concrete construction, 300 ft. x 200 ft. and two stories high. This gives a total of 100,000 sq. ft. of floor space. The plant is built on a 13-acre tract of land with a spur to the main line of the C. M. St. P. Railway (Healy Station). The cost of the building is $400,000. While the new plant provides for doubling the present output of the company, ample ground is provided for future expansion.

Modern improvements are provided for the employees' welfare, such as shower baths, grounds for athletic



ILG ELECTRIC VENTILATING COMPANY'S NEW PLANT.

events, baseball, tennis, etc. There is also a cafeteria where meals are served at cost. Other features include club rooms where moving pictures are shown, both of an educational and entertaining nature.

Profit-sharing has long been a feature of this company's business policy and has resulted in a large percentage of the employees becoming stockholders. In connection with this feature and the regulation of factory conditions, the company maintains advisory boards, consisting of company officials and department heads.

The company's products include Ilg self-cooled propeller fans and universal blowers and exhausters, also unit heaters and air washing units. Many inquiries are reported from time to time as to the meaning of the world "Ilg." Some think it is an abbreviation while others are under the impression that it is a coined word. Neither is correct. It is the name of the founder of the company, Robert A. Ilg, who is the inventor of the various Ilg apparatus. The company itself is known as the largest exclusive ventilating apparatus manufacturers in the world, with branches in 35 cities. A standing invitation is offered to visit its new plant and see how the Ilg product is made.

S. M. Weis is president of the company, J. M. Frank, vice-president and general sales manager; and Robert A. Ilg, treasurer and general manager. The department heads include: G. C. Breidert, sales promotion and advertising manager; W. H. Rietz, production manager; W. H. Hallstein, purchasing agent; A. G. Sutcliffe, mechanical engineer; C. F. Beck, supervisor of service; and C. D. Bushee, traffic manager.

Trade Literature.

CONCRETE HOUSES, HOW THEY WERE BUILT, is the title of an interesting volume, published by Concrete-Cement Publishing Co., Detroit, Mich., and containing articles descriptive of various types, with details of their construction, as published from time to time in *Concrete*. Among the houses shown and described is the "cold-proof" house in Saskatoon, Canada, a brief description of which appeared in THE HEATING AND VENTILATING MAGAZINE for May, 1920.

This is the house which was built so impervious to cold that the owner, H. Gauvin, a Canadian refrigerating engineer, was able to use electric heating without prohibitive expense. It is stated that the first cost of the house, with the added insulation used, was only 10% greater than that of ordinary frame construction. Size 9 x 12 in. Pp. 215.

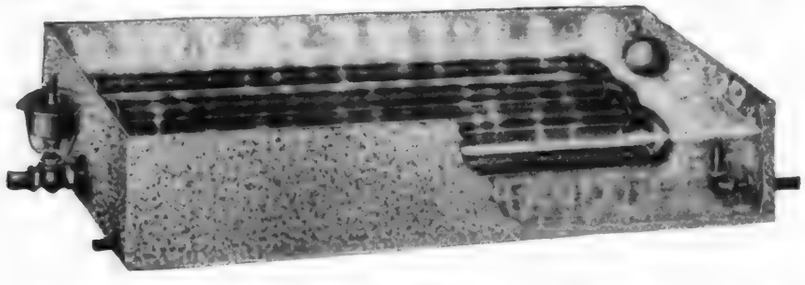
MCALEAR VACUUM AIR LINE HEATING SYSTEM, McAlear packless radiator valves and McAlear high and low pressure steam traps and Thermo vent air valves, are the subjects of three individual bulletins (Bulletin C, D and E) which have been received from the McAlear Mfg. Co., Chicago, Ill. The automatic vacuum pump used with the air line system is described at length. It consists of a large cylinder which stands vertically on its base. On top of the cylinder is mounted an automatic valve mechanism to which all air, steam and water connections are made. The air connections consist of the vacuum air lines, which connect with all the air valves throughout the building. The steam for operating the pump is taken from the low-pressure heating main or from a boiler direct, if operated low-pressure, and connected to the steam valve, which is a part of the automatic

McALEAR AUTOMATIC VACUUM PUMP.

valve mechanism. The water for condensing purposes is taken from the city water line and connected to the water valve which is also a part of the valve mechanism. All of these connections are controlled and operated by the automatic valve mechanism and thermostatic motor, mounted on top of the cylinder. The catalogue goes on to describe the operation of the pump which, it is stated produces an exceptionally high vacuum almost instantly. Attention is also called to its unusual reserve power.

Another pump shown in Bulletin C is the McAlear electric air line vacuum pump which is of the rotary type, with a single impeller which rotates on ball bearings, displacing the air with a rolling motion, thus eliminating friction and rubbing surfaces. These pumps are characterized as silent in operation, thus being well adapted to residence work, as well as hotels, office buildings, schools, etc. Bulletin D and E give the necessary information for the use of the engineer in providing for the use of both McAlear packless radiator valves, steam traps and Thermo vent air valves. Size of each bulletin 6 x 9 in. Pp. 16, 8 and 8, respectively.

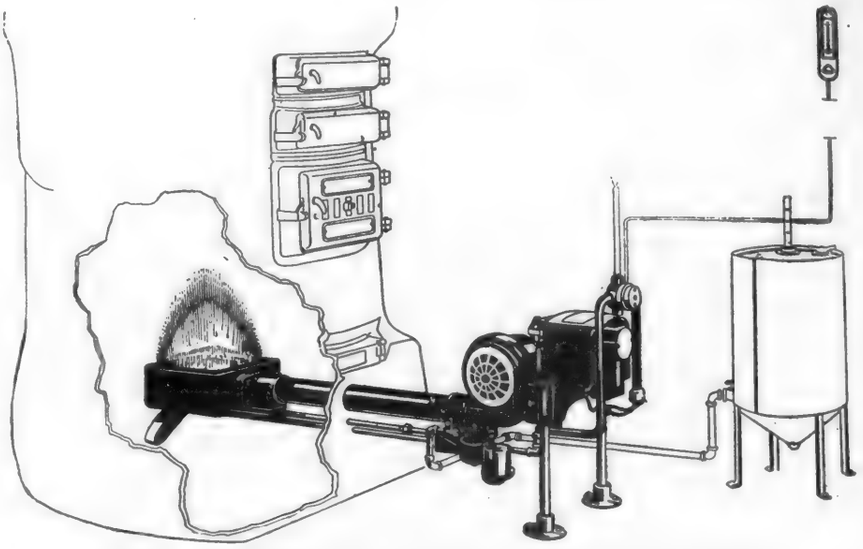
National Automatic Temperature Regulators, featuring the extensive line manufactured by the National Regulator Co., Chicago, Ill., including the Metaphram valves and motors, are presented in Catalogue F. This company not only makes a complete line of automatic temperature regulating apparatus for general use, but a full line of boiler regulators as well. Its experience of 20 years enables the company to guarantee all of its apparatus, while it is also in a position to estimate, do engineering and undertake contract work at any point. Included in the devices presented are regulators for automatically controlling air, steam or water heating systems, hot water tanks, drying ovens, lumber kilns, refrigeration and humidity; also metallic diaphragms and thermostats especially designed for recording gauges, etc. Other devices include high and low pressure steam and water boiler regulators, expansion valves, reducing valves, and hydraulic and electric air compressors. Size 6 x 9 in. Pp. 24.



NATIONAL REGULATOR COMPANY'S EVAPORATING PAN METHOD OF HUMIDIFYING.

Nokol Automatic Oil Heater, manufactured by the Steam Corporation, is brought to the attention of the trade in a readable circular (Catalogue F) which covers this device in detail. Nokol is described as an automatic oil-burning apparatus intended primarily for use in connection with residential heating plants, a majority of which now operate on coal. Its principal parts are a thermostat, an electrical control box attached to the blower and electricaliy connected with the thermostat, a blower or "atomizer," a combustion chamber housing an ever-burning pilot-light, and an oil tank. Thermostatic action causes the blower to act, drawing up oil before which a fan blows it into a cool spray within the combustion chamber where the pilot-light ignites it. The three requirements for the installation of the Nokol device are given as (1) a good heating plant, either water, air or steam, its previous coal consumption not exceeding 700 ibs. of coal per day per heater, or approximately 40 tons of coal per heating season; (2) a direct electric current, 110-volt, or 110-volt, 60-cycle alternating current, electricity being required to operate the blower; (3) a small supply of artificial or natural gas to supply the pilot-light in the combustion chamber. Special mention is made of the ease with which the device may be installed. This is done by removing the fire grates and ash door of the furnace inserting the combustion chamber of Nokol through this door and letting it rest where the fire-grates were. Kerosene is the oil recommended for use with Nokol; it will not burn crude oil, or coal tar. It is stated that the company's dealer can usually aid in obtaining a cheaper oil than kerosene and one suited to Nokol's requirements. The catalogue includes some convincing test records, followed by suggestions on the matter of supply tanks. The concluding pages are devoted to instructions for the operation of Nokol. Sixe 5½ x 7½ in. Pp. 24.

New Detroit Improved Multi-Port Valve, which has been brought out by the Detroit Lubricator Co., Detroit, Mich., is the subject of a special circular which includes illustrations of its construction features. The valve is intended for vapor and vacuum heating systems and is a double adjustment valve of the packed type. It is fitted with a Jenkins disc to insure a tight shut-off when the valve is closed. When the valve is adjusted by the steam fitter upon installation and when the system is ready to operate, the rate of flow of steam through the valve may be limited to the amount required to fill the particular radiator to which the valve is attached and no more. This adjustment is made by setting the stop pin in the proper hole in the dial to restrict the swing of the handle and the consequent lift of the valve disc to give the necessary maximum opening, determined as already explained. This disc holder is a close working fit in the calibration shell, the shell being burnished into the valve body immediately above the seat. As the disc is lifted, the disc holder acts as a piston valve to uncover the ports



TYPICAL INSTALLATION OF NOKOL AUTOMATIC OIL HEATER.

NEW DETROIT MULTI-PORT VALVE.

in the shell. The shape and arrangement of these ports are such as to closely calibrate the steam flow. As the handle is turned the ports give proportionally small valve openings in the lower ranges of the hand travel and the valve lift. The valve is made in four sizes from ½-in. to 1¼-in.

KING KOAL KARBURETOR, a device for attachment to any type of heater, and

CONSTRUCTION OF KING KOAL KARBURETOR.

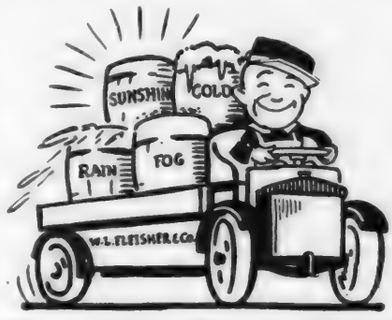
which is designed to give more heat from less coal, is featured in a blanket circular issued by Frederick Sabin & Co., Inc., 237-241 Bread St., Philadelphia, Pa., sole distributors for the United States. This device is intended to admit into the fire box a separate supply of hot oxygen to mix with the liberated carbon monoxide gas and fire it in the fire box. A number of tests are quoted in detail showing the savings effected with the King Koal Karburetor. With its use, it is stated, it is possible to burn a smaller, cheaper grade of coal with better results than without the "Karburetor." The list price of the size used for furnace or boiler is $15.00.

SAVE MONEY AND HELP SAVE COAL is the title given by J. C. Hornung, Chicago, Ill., to a timely circular on "Some Facts About Pressure and Temperature Control of Steam Heat," based on figures from the records of the Central Illinois Light Company, on an office building in Peoria, Ill. Steam was sold on a meter basis and the comparison is for the season of 1918-1919 and 1919-1920.

The figures for the second year are those obtained after the installation of a Hornung pressure and temperature control valve of the type illustrated in the circular. The comment is made that this one building saved $1283.85 in one season, about six times the cost of the valve.

BUFFALO STANDARD PIPE COIL HEATERS (Catalogue 460) has been received from the Buffalo Forge Co., Buffalo, N. Y., It is in keeping with the other catalogues of this company, reviewed in last month's issue, and conforms to the standard the company has adopted, both in size and arrangement. The catalogue has been prepared with the view to make it most useful to architects and engineers in figuring the heater requirements for fan heating and ventilating work. The tables have been elaborated to include all the conditions usually met with in practice and to permit the user to read the values direct. To meet unusual conditions the company has added curves giving values for various steam pressures and air velocities. Tables for Vento heaters are also included. In discussing the Buffalo standard heater itself, the points of superiority mentioned are (1) a perfect circulation of steam; (2) perfect drainage, the design of the base giving no opportunity for the pocketing of water; (3) high efficiency of radiating surface and low resistance to air flow secured through the proportioning of the air passage; and (4) the method of independently connecting each section to the steam main and the control of the steam supply by valves so that as many sections as desired may be in operation. Size 8½ x 11 in. Pp. 68 (punched for binding).

WE DELIVER CLIMATES is the novel claim of W. L. Fleisher & Co., Inc., "contracting industrial engineers," New York, expressed in a circular calling attention to their work in air conditioning. Any air conditions in the world, it is declared, can be duplicated and maintained in factories, such as a cool



THE FLEISHER IDEA OF FURNISHING CONDITIONED AIR.

climate with low humidity for chocolate manufacturing, a warm climate with high humidity for bread dough, a cold climate with high humidity for cold storage and a warm climate with low humidity for photographic materials. Several typical illustrations are shown for the purposes just mentioned, Sturtevant apparatus being used in each case.

G-R STRAINERS, for use on the suction and discharge lines of lubricating, fuel or quenching oil systems for the removal of solid foreign material in suspension; also in power plants which secure their raw water supply from such sources as rivers and lakes, are featured in circular matter (Form Sheet No. 168) received from the Griscom-Russell Co., New York. The body is made of cast-iron and the strainer basket of perforated sheet steel and lined with wire mesh when the strainer is to be used on an oil line. The G-R strainer is of the single type and may be installed either as a single unit or as a set. The set consists of two of these strainers connected, including two three-way valves and necessary connecting elbows, unions and nipples. This set permits the cleaning of either of the two units without interruption of the service.

HIGH-TEMPERATURE AIR FOR DRYING AND PROCESSING, featuring the Harrison Aertube heater, is discussed from an engineering standpoint in a notable catalogue issued by the Carrier Engineering Corporation, New York. The heater is the design of Burt S. Harrison and was first placed on the market in 1909. It has been found particularly adaptable for the industrial use of air for drying and processing, at temperatures exceeding 300° F. A brief history of high-temperature development is given and this is followed by a discussion in detail of reasons why the Aertube heater should be used in preference to superheated steam or forced circulation oil. Color charts giving a comparison of results obtained with direct-fired gas, electric heat, steam or oil and by use of the Aretube heater for the heating display.

A separate section of the catalogue is devoted to low-temperature applications

STEAM IS GIVEN IN POUNDS

	Oct	Nov	Dec	Jan.	Feb.	Mar	Apr	May
Steam Used 1918-1919	829000	1727000	1656000	2520000	2329000	1768000	1144000	883000
Steam Used 1919-1920	344000	1551000	2143000	2373000	1894000	1745000	988000	751000
Average Temp 1918-1919	57 6	45 9	40 0	25 3	32 7	37 6	50 8	52 3
Average Temp 1919-1920	59 1	43 3	20 7	22 0	28 0	34 2	46 2	57 6
Difference in Temperature	1 5	2 6	19 3	3 3	4 7	3 4	4 6	3 3
*Steam Required 1918-1919	780000	1855000	2820000	2700000	2620000	1954000	1416000	767000
Steam Used 1919 1920	344000	1551000	2413000	2373000	1894000	1745000	988000	751000
Saving in Steam	436000	204000	407000	327000	726000	209000	428000	16000
Saving in Money	196 20	136.20	183 15	147 15	326 70	94 05	192.60	7 20

*Note The steam that would have been required for 1918-1919 if the average outside temperature for 1918-1919 had been the same as for 1919-1920.

COMPARATIVE USE OF STEAM WITH AND WITHOUT A HORNUNG PRESSURE AND TEMPERATURE CONTROL VALVE.

A TYPICAL AERTUBE INSTALLATION, CAPACITY 1,000,000 B. T. U. PER HOUR.

of the Aertube heater make an effective of large buildings, including factories and schools. Size 6 x 9 in. Pp. 44.

Heating Contractors' Association Names New Standardization Committee.

President J. E. Rutzler of the Heating and Piping Contractors' National Association has appointed the following Committee on Standarization:

W. L. Fleisher, New York City, chairman; M. B. Crowell, Cleveland; Ralph Franklin, Boston; Harry M. Hart, Chicago; E. W. Mandeville, Brooklyn; and S. Austin Pope, Chicago.

Opening of New Plant of Kewanee Boiler Company.

CHICAGO HEATING CONTRACTORS and supply men to the number of 175 were the guests of the Kewanee Boiler Company, Kewanee, Ill., on a recent trip of inspection to the company's new $1,000,000 addition to its plant. The party traveled on a special train to Kewanee, where cars were in waiting to take the visitors to the new plant. The arrangements were in charge of President E. E. Baker and Director C. V. Kellogg. The occasion marked the 25th anniversary of the company's removal to Kewanee.

An Improved Type of Gas Cock.

A new inexpensive modification of the ordinary gas cock, as applied to stoves, chandeliers and all other kinds of ground key work for gas, air and oil, designed to eliminate entirely the stop pin post or has been brought out by the Aws Mfg. Co., 398 Harman St., Brooklyn, N. Y., manufacturer of gas and electrical appliances. A supplementary feature is a peripheral groove in the taper of the key which acts not only as a grease cup but, by reason of its being at the upper end, also acts as a packing against dust and leaks. Where it is desirable to use a spring ring washer or a felt washer in place of grease, the groove permits this to be done.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF THE HEATING AND VENTILATING MAGAZINE, published monthly at Cooperstown, N. Y., for October 1, 1920.

State of New York, County of New York, ss.

Before me, a notary public in and for the State aforesaid, personally appeared A. S. Armagnac, who, having been duly sworn, according to law, deposes and says that he is the Editor of THE HEATING AND VENTILATING MAGAZINE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443 Postal Laws and Regulation printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Heating and Ventilating Magazine Co., 1123 Broadway, New York, N. Y.

Editor, A. S. Armagnac, 1123 Broadway, New York, N. Y.

Managing Editor: None.

Business Manager: Gustave Petersen, 1123 Broadway, New York, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or if a Corporation, give its name and the names and address of stockholders owing or holding 1 per cent or more of the total amount of stock.)

Heating and Ventilating Magazine Co., 1123 Broadway, New York, N. Y.

A. S. Armagnac, 1123 Broadway, New York, Gustave Petersen, 1123 Broadway, New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

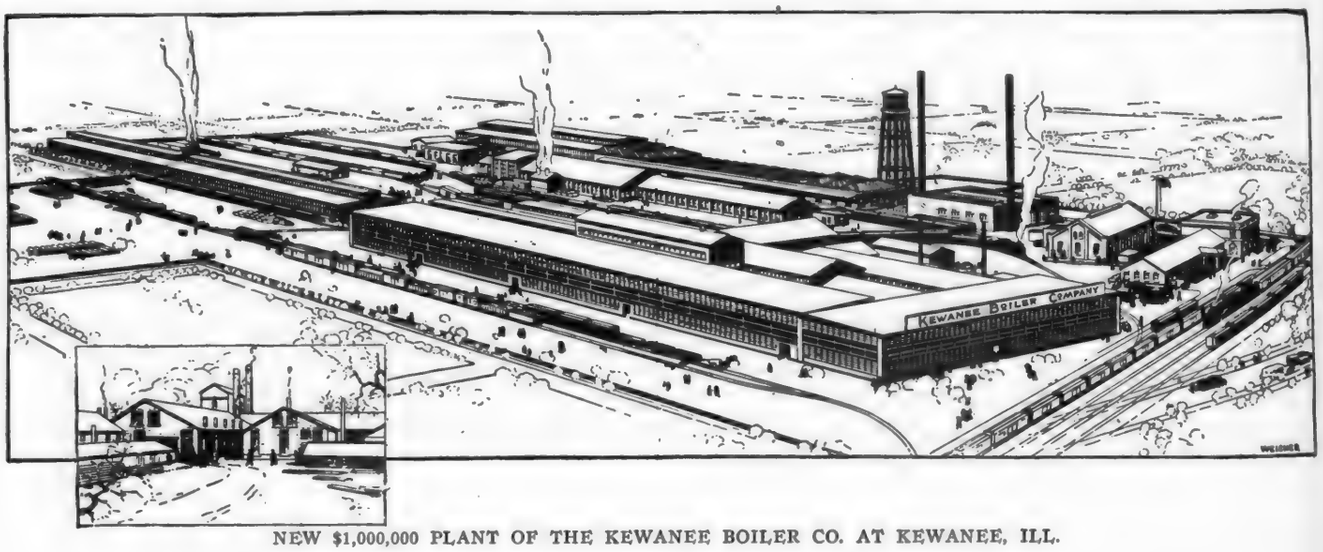
4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stock holders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona-fide owner and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

A. S. ARMAGNAC, Editor.

Sworn to and subscribed before me this 1st day of October, 1920.

A. L. SCANTLEBURY.

Notary Public, Kings County, No. 396.
Certificate filed in N. Y. County, County Clerks, No. 291.
(My commission expires March 30, 1921.)



NEW $1,000,000 PLANT OF THE KEWANEE BOILER CO. AT KEWANEE, ILL.

The De Luxe Heating Service

ESTIMATE by usual methods the fuel cost of warming the OLD or NEW building for a heating season. Divide by 3. The result will be the actual fuel saving that can be effected with the

New IDEAL Type "A" Heat Machine

The precise Heating Laboratory tests prove an economy and an efficiency yielding the largest interest return (33⅓ per cent) possible in any feature of household equipment. *Ask for the heat-chart catalog of IDEAL Type "A" Boilers.*

AMERICAN RADIATOR COMPANY

Sales Branches and Show Rooms in all the Large Cities.

Makers of the world-famous IDEAL Boilers and AMERICAN Radiators

THE HEATING AND VENTILATING MAGAZINE—1123 BROADWAY, N. Y. CITY

STEAM LAUNDRIES.

Data for Laundry Apparatus.

In the absence of definite information from the manufacturer of the special laundry machinery to be installed, the following information may be used as covering the average requirements likely to be encountered:

TABLE IV.

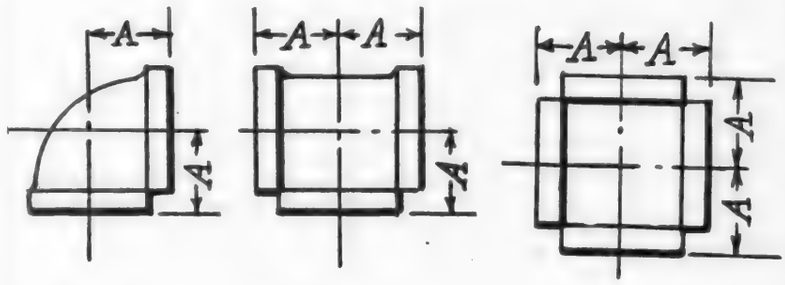
APPARATUS.	Boiler Horse Power (Approximate).	Steam Connections In. Diameter.			Water Connections In. Diameter.			Gas Connections In. Diameter.	Air Connections, In. Diameter.	Horse Power to Drive Mechanical.
Apparatus		Supply	Drip	Trap	Hot	Cold	Waste			
Washer (24 in.x24 in. and Vp.)	0.20	1/2	——	——	1 1/4	1 1/4	2 1/2	——	——	1
Washer (single geared) (33 in. x36 in. and Vp.)	0.20	1/2	——	——	1 1/2	1 1/2	3	——	——	1 1/2
Washer (double geared) (36 in.x54 in. and Vp.)	0.40	1/2	——	——	2	2	3	——	——	——
Washer (sterilizing)	0.20	1/2	——	——	1 1/2	1 1/2	3	——	——	——
Sterilizer	——	1	——	——	——	——	——	——	——	——
Skirt ironing table	——	——	——	——	——	——	——	3/8	3/8	——
Shirt ironing table	——	——	——	——	——	——	——	3/8	3/8	——
Ironer (sleeve)	——	1/2	1/2		——	——	——	3/8	3/8	0.3
Ironer (body)	——	1/2	1/2	——	——	——	——	3/8	3/8	0.3
Ironer, flat work (single roll)	1/2	1/2	1/2	1/2	——	——	——	——	——	——
Ironer, flat work, (three and five-roll)	3/4	1	3/4	1/2	——	——	——	——	——	——
Ironer, flat work, (100 in. five-roll)	1	1 1/4	1	3/4	——	——	——	——	——	1 1/2
Ironer, collar and cuff	1 1/2	3/4	1/2	3/4	——	——	——	——	——	1
Art edger		——	——	——	——	——	——	——	——	0.3
Cabinet dry room		(See description)								
Conveyor dry room, (two-loop)	4	1 1/4	1 1/4	1 1/2	——	——	——	——	——	0 75
Conveyor dry room, (three-loop)	5	1 1/4	1 1/4	1 1/2	——	——	——	——	——	1
Starcher, (collar and cuff)	0.2	3/8	3/8	——	——	——	——	——	——	) .25
Dampener, (collar and cuff)	——	——	——	——	——	3/8	——	——	——	0.3
Dampener (wing point)	0.1	3/8	3/8	——	——	——	——	——	——	——
Dampener (skinner)	0.1	——	——	——	——	——	——	——	——	——
Dampener (spray)	0.1	3/8	——	——	——	3/8	3/8	——	——	——
Tumbler	6	1 1/4	1	——	——	——	——	——	——	3
Wash tube (each compartment)	0.05	——	——	1/2	1/2	1 1/2	——	——	——	——
Extractor	——	——	——	——	——	——	2	——	——	2
Soap tank	0.1	1/2	——	——	——	3/4	——	——	——	——
Bleach tank	0.1	1/2	——	——	——	1/2	——	——	——	——
Shaper (hot tube)	0.2	2/8	3/8	——	——	——	——	——	——	——
Shaper (collar)	——	——	——	——	——	——	——	1/4	——	——
Moulder (collar)	0.2	3/8	3/8	——	——	——	——	——	——	——
Press (bosom)	1	1	3/4	1/2	——	——	——	——	——	0.5
Press (dampening)	0.2	——	——	——	——	——	——	——	——	——
Press (neckband)	0.3	3/8	3/8	——	——	——	——	——	3/8	——
Press (cuff)	0.3	3/8	3/8	——	——	——	——	——	3/8	——
Press (yoke)	0.3	3/8	3/8	——	——	——	——	——	3/8	——
Starch cooker	0.1	3/8	3/8	——	——	3/8	3/8	——	——	——
Hot-water tank	——	——	——	——	——	——	——	——	——	——
Coal heater	——	——	——	——	——	——	——	——	——	——

THE HEATING AND VENTILATING MAGAZINE—1123 BROADWAY, N. Y. CITY

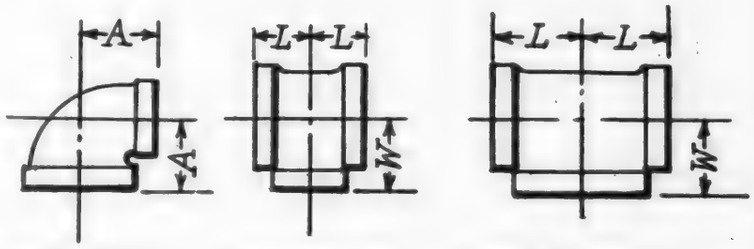
FITTINGS.

Standard Weight Cast-Iron Screwed Fittings.

—125 Lbs. Working Pressure—



ELL TEE CROSS



RED. ELL RED. TEE BULLHEAD TEE

Run x Branch In. Diam. In. Diam.	A In. Diam.	L In. Diam.	W In. Diam.
¼ Straight	13/16	.....	.....
¼ x ⅜ Bh.	.....	15/16	15/16
⅜ Straight	15/16	.....	.....
⅜ x ¼ Red.	.....	15/16	15/16
½ Straight	1 3/32	.....	.....
½ x ¾ Bh.	.....	1 1/4	1 5/32
½ x 1 Bh.	.....	1 13/32	1 7/32
¾ Straight	1 5/16	.....	.....
¾ x 1 Bh.	.....	1 15/32	1 3/8
¾ x 1¼ Bh.	.....	1 11/16	1 7/16
1 x ½ Red.	.....	1 7/32	1 13/32
1 x ¾ Red.	.....	1 3/8	1 15/32
1 Straight	1 17/32	.....	.....
1 x 1½ Bh.	.....	1 7/8	1 21/32

NOTE: For all reducing (Red.) and bullhead (Bh.) tees the size of run is given first and the size of branch second. Fittings reducing on the run retain the same dimension as corresonding fittings without such reduction.

Above dimensions are subject to slight variation and are based on fittings as made by the Walworth Mfg. Co.

(*Continued on Data Sheet No.* 109-A.)

THE HEATING AND VENTILATING MAGAZINE—1123 BROADWAY, N. Y. CITY

FITTINGS.

Standard Weight Cast-Iron Screwed Fittings.

125 Lbs. Working Pressure.

(*Continued from Data Sheet No.* 109.)

Run In. Diam.		Branch In. Diam.		A In. Diam.	L In. Diam.	W In. Diam.
1¼	x	1½	Red.	.....	1 9/32	1 5/8
1¼	x	¾	Red.	.....	1 7/16	1 11/16
1¼	x	1	Red.	.....	1 19/32	1 3/4
1¼	Straight			1 13/16	.....	.....
1¼	x	1½	Bh.	.....	1 15/15	1 7/8
1¼	x	2	Bh.	.....	2 1/4	1 15/16
1½	x	½	Red.	.....	1 11/32	1 3/4
1½	x	¾	Red.	.....	1 1/2	1 13/16
1½	x	1	Red.	.....	1 21/32	1 7/8
1½	x	1¼	Red.	.....	1 7/8	1 15/16
1½	Straight			2	.....	.....
1½	x	2	Bh.	.....	2 5/16	2 1/16
1½	x	2½	Bh.	.....	2 11/16	2 3/16
2	x	½	Red.	.....	1 13/32	2 1/16
2	x	¾	Red.	.....	1 9/16	2 1/8
2	x	1	Red.	.....	1 23/32	2 3/16
2	x	1¼	Red.	.....	1 15/16	2 1/4
2	x	1½	Red.	.....	2 1/16	2 5/16
2	Straight			2 3/8	.....	.....
2	x	2½	Bh.	.....	2 3/4	2 1/2
2	x	3	Bh.	.....	3 1/16	2 5/8
2½	x	1	Red.	.....	1 27/32	2 9/16
2½	x	1¼	Red.	.....	2 1/16	2 5/8
2½	x	1½	Red.	.....	2 3/16	2 11/16
2½	x	2	Red.	.....	2 1/2	2 3/4
2½	Straight			2 7/8	.....	.....
2½	x	3	Bh.	.....	3 3/16	[illegible]
2½	x	3½	Bh.	.....	3 15/32	3 1/16
2½	x	4	Bh.	.....	3 13/16	3 1/8
3	x	1	Red.	.....	1 31/32	2 7/8
3	x	1¼	Red.	.....	2 3/16	2 15/16
3	x	1½	Red.	.....	2 5/16	[illegible]
3	x	2	Red.	.....	2 5/8	3 1/16
3	x	2½	Red.	.....	3	3 3/16
3	Straight			3 5/16	.....	.....
3	x	3½	Bh.	.....	3 19/32	3 3/8
3	x	4	Bh.	.....	3 15/16	3 7/16
3½	x	1½	Red.	.....	2 3/8	3 9/32
3½	x	2	Red.	.....	2 11/16	3 11/32
3½	x	2½	Red.	.....	3 1/16	3 15/32
3½	x	3	Red.	.....	3 3/8	3 19/32
3½	Straight			3 21/32	.....	.....
3½	x	4	Bh.	.....	4	3 23/32
4	x	1	Red.	.....	2 3/32	3 1/2
4	x	1½	Red.	.....	2 7/16	3 5/8
4	x	2	Red.	.....	2 3/4	3 11/16
4	x	2½	Red.	.....	3 1/8	3 13/16
4	x	3	Red.	.....	3 7/16	3 15/16
4	x	3½	Red.	.....	3 23/32	[illegible]
4	Straight			8 1/16	.....	.....
4	x	5	Bh.	.....	4 19/32	4 1/8
4	x	6	Bh.	.....	5 1/4	4 1/8

(*Concluded on Data Sheet No.* 109-B)

THE HEATING AND VENTILATING MAGAZINE—1123 BROADWAY, N. Y. CITY

FITTINGS

Standard Weight Cast-Iron Screwed Fittings.

125 Lbs. Working Pressure.

(Concluded from Data Sheet No. 109-A.)

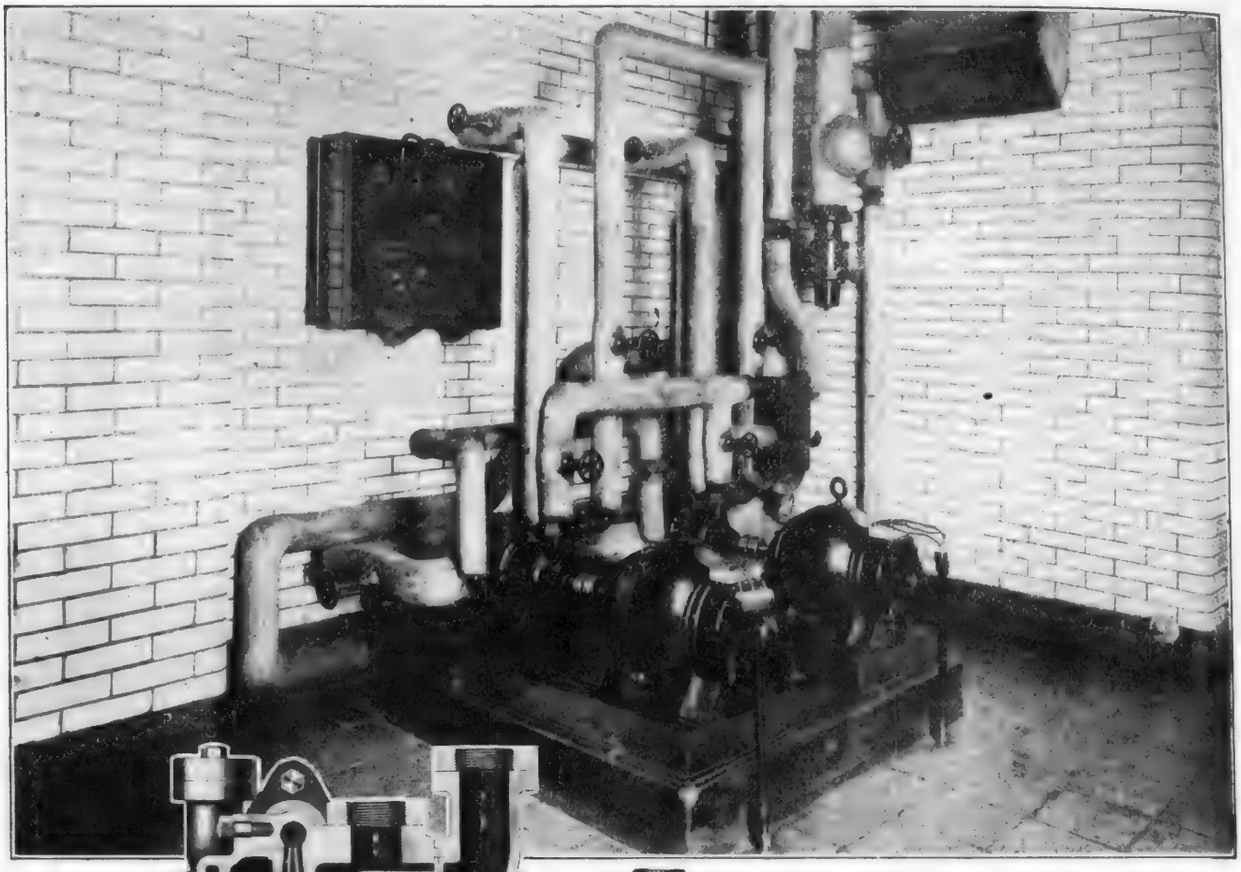
Run In. Diam.		Branch In. Diam.		A In. Diam.	L In. Diam.	W In. Diam.
5	x	1½	Red.	.....	2 1/2	4 5/32
5	x	2	Red.	.....	2 13/16	4 7/32
5	x	3	Red.	.....	3 1/2	4 15/32
5	x	4	Red.	.....	4 1/8	4 19/32
5	Straight			4 21/32	.....	.....
5	x	6	Bh.	.....	5 5/16	4 21/32
6	x	2	Red.	.....	2 13/16	4 7/8
6	x	3	Red.	.....	3 1/2	5 1/8
6	x	4	Red.	.....	4 1/8	5 1/4
6	x	5	Red.	.....	4 23/32	5 5/16
6	Straight			5 5/16	.....	.....
6	x	8	Bh.	.....	6 9/16	5 3/8

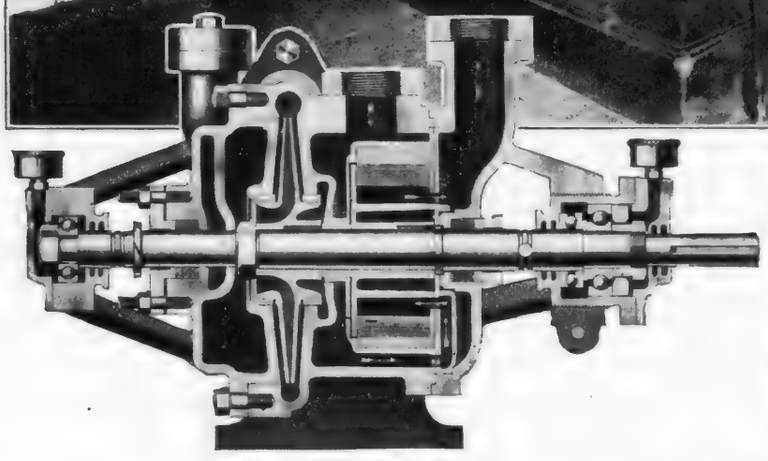
Run In. Diam.		Branch In. Diam.		A In. Diam.	L In. Diam.	W In. Diam.
7	x	4	Red.	.....	4 3/16	5 15/16
7	x	5	Red.	.....	4 23/32	6
7	x	6	Red.	.....	5 3/8	6
7	Straight			6 1/16	.....	.....
8	x	2	Red.	.....	2 7/8	6 1/8
8	x	4	Red.	.....	4 3/16	6 1/2
8	x	6	Red.	.....	5 3/8	6 9/16
8	Straight			6 13/16	.....	.....
10	x	4	Red.	.....	4 1/8	7 11/16
10	x	6	Red.	.....	5 5/16	7 3/4
10	x	8	Red.	.....	6 9/16	7 13/16
10	Straight			8 1/4	.....	.....

NOTE: For all reducing (Red.) and bullhead (Bh.) tees the size of run is given first and the size of branch second. Fittings reducing on the run retain the same dimension as corresponding fittings without such reduction.

Above dimensions are subject to slight variation and are based on fittings as made by the Walworth Mfg. Co.

EFFICIENT HEATING *demands the* JENNINGS PUMP





Duplex "C" Unit, Automatic Operation

AMERICAN EXPRESS BUILDING
65 Broadway
New York City

Combined capacity 52,000 sq. ft. direct radiation. Each pump has an air capacity of nineteen cubic feet per minute in addition to a water capacity of thirty-five gallons per minute.
Installed November, 1916.
The motors are only two horse power.

THE Jennings Pump consists of two independent turbine units, an air pump and a water pump. As each material is handled separately, the boiler pressure is against the water only. The air and vapor, approximately four-fifths of the volume handled, are delivered to atmosphere without back pressure. The saving in horse power is over fifty per cent.

Because of its compact design, this equipment can be installed in less than one-third the space necessary with other apparatus. All interior parts are bronze, supported on annular ball bearings mounted outside of casing. Moving parts revolve without contact.

There are many other reasons why the Jennings is being installed on practically all of the big jobs. Bulletin No. 8 gives them in detail Write for it.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONN., U. S. A.

TRADE AND MISCELLANEOUS NOTES

Coming Events.

JANUARY 26-28, 1921—Annual meeting of the American Society of Heating and Ventilating Engineers, in Philadelphia, Pa. A preliminary business session will be held in New York, January 25.

NOVEMBER 16-18, 1920—Annual convention of the American Gas Association in New York. Headquarters at the Hotel Pennsylvania.

Miscellaneous Notes.

HERBERT HOOVER has been appointed a member of the Advisory Board for the Eastern Industrial Region, Superpower Survey, now being conducted by the Geological Survey.

NINTH ANNUAL SAFETY CONGRESS, held in Milwaukee, Wis., September 27-October 1 attracted an attendance of 3,100 persons. Everywhere, at the sectional meetings, the general meetings, and in the lobby discussions, there was the feeling that to make industry safe we must go out of the shop and reach the workmen in their homes, not only with the lesson of safety, but that of good health as well. President Tolman, in contrasting the safety movements in America and Europe, said that there was one thing that impressed him particularly as essential to the safety movement, and that was that it depends entirely upon a sense of individual responsibility. The safety movement in Europe, he said, was largely a matter of mechanical exhibitions and an autocratic enforcement of rules. It nevertheless did good. In England the safety movement was more paternalistic and a matter of enforcement of rules of hygiene, as well as mechanical safeguarding. In America the safety movement is noticeably a democratic movement dealing, for the greater part, with the humane consideration and with the individual himself. The safety movement, where it has succeeded largely, has so succeeded because the individual was himself made to feel the responsibility both for himself and his fellow-workers."

NATIONAL FOREIGN TRADE COUNCIL, at its seventh annual meeting in New York, selected Cleveland as the place in which to hold the Eighth National Foreign Trade Convention, scheduled for the spring of 1921. Cleveland was selected on account of its location as the center of the most productive industrial district in the country. It is estimated that the manufacturers of this district, within a line drawn from Buffalo down to Pittsburgh, across to Dayton and Cincinnati, and up to Chicago and Detroit, is about $7,501,319,000 each year. Of this huge total, government statistics show that products to the value of $500,000,000 were exported.

CLEVELAND'S new public hall, for which the cornerstone has just been laid, will be the largest structure of its kind in the United States. An idea of its proportions may be gained from the statement that the hall is to cover two city blocks, that its roof area is nearly three acres and that its main auditorium or arena will have a seating capacity of 13,000. The basement is designed for exposition purposes and to indicate the amount of thought that has been given to details, literally miles of pipe lines will be installed in the basement ceiling to supply compressed air, vacuum, gas, steam, electricity and water power to exhibitors.

HOWARD & MORSE

45 FULTON STREET, NEW YORK

VENTILATING ENGINEERS AND CONTRACTORS

MANUFACTURERS OF

Blackman

AND

Duplex Cone Fans

COMPLETE WITH

Motors, Duct Work and Wiring

Aligning, Rigging, Hoisting

GET OUR PRICES, PROFIT BY OUR EXPERIENCE OF LONG STANDING.

SEND FOR CATALOGUE.

thus permitting the demonstration of any kind of machinery. It is planned to complete the arena section by the Fall of 1921. The total cost of the arena, with its two units and equipment, will be $5,000,000, partly provided for through the bond issue campaign conducted by the Committee of One Hundred Organizations.

EASTERN SUPPLY ASSOCIATION is canvassing its members regarding the use of automobiles by salesmen of supply houses. The result of the canvass will be published for the guidance of its members. In a recent bulletin issued by the association, attention is called to the fact on April 19, 1920, a law became effective in New York State whereby the usual provision inserted in a contract can be enforced. It will be recalled that, prior to this enactment, either side, at any time, could repudiate or refuse to arbitrate in accordance with such a provision, at any time prior to an award. A party desiring to arbitrate upon a contract made subsequent to April 19, 1920, need only apply to the Supreme Court for an order directing the arbitration to proceed in accordance with the terms of the arbitration clause, and, under the new law, upon the court being satisfied that the matter to be arbitrated was one specified in the arbitration clause, it must issue its order directing the arbitration to proceed.

There is, however, some question as to the constitutionality of the new law, due to the fact that it deprives the party refusing to arbitrate of his righ to have the case tried by a jury.

VALPARAISO UNIVERSITY, Valparaiso, Ind., has recently re-opened a complete course in architectural engineering. Trade publications applicable to this course will be welcomed and will become part of a file used to give the student first-hand information of various building materials. Those publications giving manufacturers' specifications and methods of application are especially desired. They should be addressed to Professor Wilson Carelton.

RUSSELL T. GRAY, advertising engineer, Chicago, announces the removal of his offices to 616 South Michigan Avenue.

CONSERVADOR, described as a vitalizer to

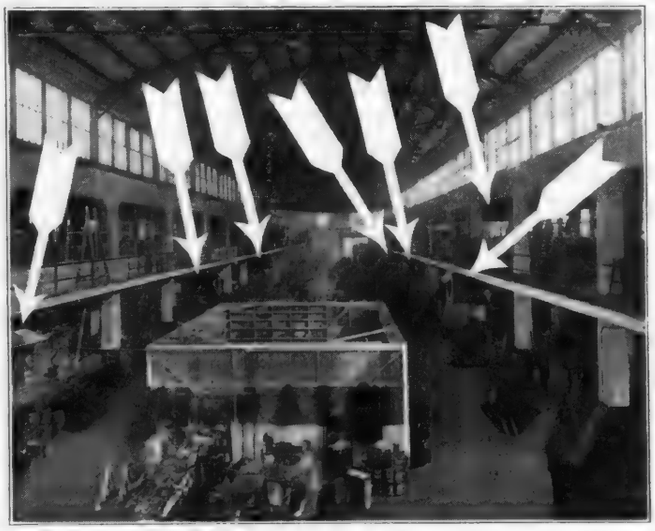
ILGAIR UNIT HEATERS

circulate heat at the floor level where it belongs—to obtain economical heating.

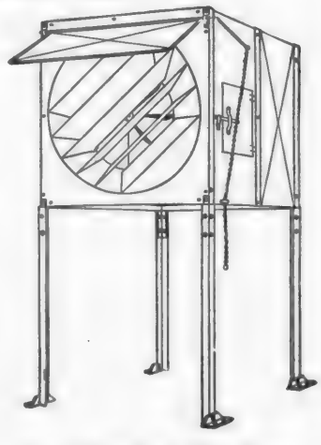
Less Costly to Maintain than Direct Radiation or Blast Systems

Particularly desirable for "Monitor or Saw Tooth" roof type of buildings. A correct solution for local cold spots or inadequate systems.

Exterior View of Monitor Type Building Occupied by Service Station Equipment Co., Chicago, Ill., Equipped with Ilgair Unit Heaters



Interior View of [illegible] Type of Ilgai. Unit Heaters



Floor Type Ilgair Unit Heater, also made for Ceiling Suspension

Orders for Heating Systems to be Installed this Winter Should be Placed Now

The Present Day Coal Situation Demands Heating Economy

Send for Descriptive Literature

ILG ELECTRIC VENTILATING CO.

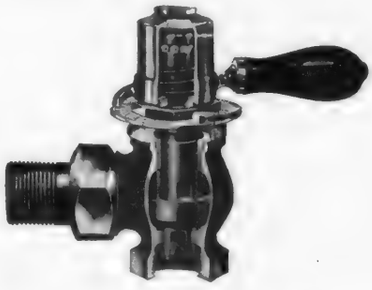
158 Whiting Street **Chicago, Ill.**

Branches in all large cities

DOLE PACKLESS RADIATOR VALVES

Insure Satisfaction

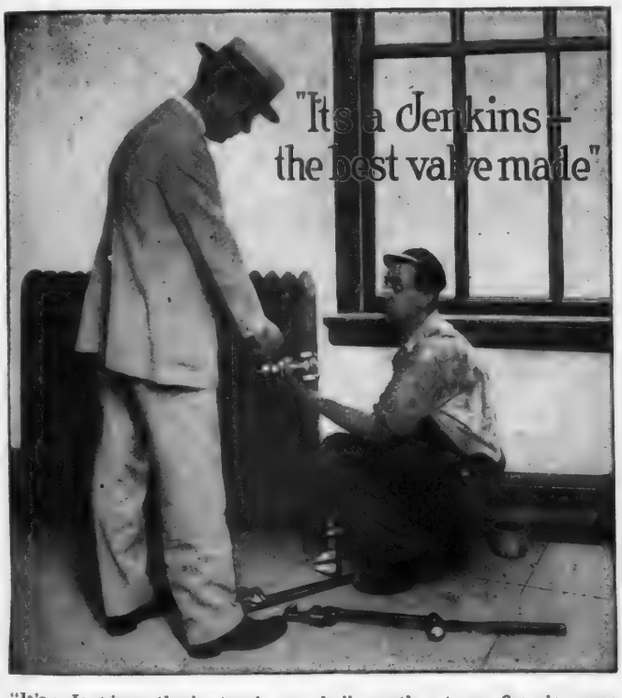
A Valve for Every System



Write for Catalogue and Discounts

The Dole Valve Company

208 North Wells St. CHICAGO



"It's a Jenkins—the best valve made," was the steam fitter's reply to the inquiry of a prospective tenant regarding the kind of valves he was installing in a new office building. Genuine Jenkins Valves are known by the name and Diamond Mark cast on the body. JENKINS BROS., New York, Chicago, Philadelphia, Washington, St. Louis, Boston, San Francisco, Pittsburgh, Montreal, London, Havana. 2226-J

Jenkins Valves

SINCE 1864

When they go back to adjust the traps—Who pays?

YOU may have to pay the expense of adjusting radiator traps—unless you've used traps that you don't have to adjust.

That's one reason why so many plumbers and fitters are using and recommending Johns-Manville Radiator Trap.

Here's a trap that not only discharges water, but also air—it doesn't air bind—and there are no expanding members or parts that require adjustment.

For the only moving part in a Johns-Manville Radiator Trap is a hollow copper ball which floats unattached up and down with the water level in the trap.

When the water level drops, the ball drops; gradually rolling over the discharge orifice of the trap, thus throttling down the outflow and maintaining sufficient water in the trap to provide a water seal and prevent leakage of steam. When the water level raises the ball, the discharge orifice is exposed and the water is free to flow out of the trap.

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10 Factories—Branches in 64 Large Cities
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Asbestos
and its allied products
JOHNS-MANVILLE
Serves in Conservation
Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS MANVILLE Radiator Trap

preserve food, has been developed by Dr. Harry Barringer Cox, a well-known inventor, and was recently demonstrated in New York. It is intended to preserve indefinitely fruits and vegetables without the aid of ice or chemicals. In describing the device Dr. Cox said that he has simply harnessed the earth currents which reach vegetables so long as they are in the ground and fruits so long as they are on the tree or vine. In the bottom of a tin can he places an instrument which he calls a "vitalizer." A wire connecting the "vitalizer" with a gas pipe, water pipe or any other metallic substance ultimately connected with either earth or water, is all that is necessary to establish connection with the earth currents. In his demonstration Dr. Cox showed oranges labeled 1918 and carrots dated a year ago, both as firm and apparently as fresh as if freshly gathered. Special interest attaches to the invention on the part of heating engineers in connection with its possible effect on the food-drying industry.

NEW YORK—During the Fall coal shortage in New York City, an ordinance prohibiting the use of soft coal was suspended by Dr. Royal S. Copeland, commissioner of health. The suspension was to continue until sufficient hard coal reached the New York market to supply heating plants. In making the announcement, Dr. Copeland warned landlords not to fill their bins with soft coal, as they would not be permitted to use it after the scarcity of anthracite began to be relieved. Dr. Copeland's action was taken because of the law that compels a landlord to supply heat to tenants.

BUILDING OPERATIONS for September, according to the *American Contractor*, showed a marked drop from the preceding month. In the Borough of Manhattan, New York City, they declined from $18,199,560 in August to $5,825,400 in September. September, however, is normally the month showing autumnal recession. The reports from 203 cities give a total valuation of $101,834,729 for 38,383 permits issued. August returns from 177 cities gave a total valuation of $110,937,493, making the average valuation per city for August permits $626,750, as against an average valuation of only $501,640 for September. Both these averages are considerably under the computed average monthly valuation per city for the first eight months of 1920, which is $696,920.

Comparing August and September activity in 167 cities shows September gains in seventy-one and losses in ninety-six. Among the important cities showing gains are Los Angeles, which leads for the month; Detroit, which is second; San Francisco, Washington, D. C.; Omaha, Borough of Bronx, Cincinnati, Cleveland, Milwaukee, and Baltimore.

NEW YORK—In an article written before the British coal strike commenced and published in the Commerce Monthly, issued by the National Bank of Commerce in New York, the statement is made that as a result of the coal shortage which menaces the world, only the United States and Great Britain are assured of sufficient fuel to operate their industries at capacity during the coming winter. The article indicates that at the present rate of monthly receipts, not a single importing country in Europe or South America is receiving a supply which is even approximately adequate. France is now receiving coal at about two-thirds the rate which would be necessary to assure operation of French industries at capacity; Italian receipts are about three-fifths of the estimated necessary amount; Netherlands is receiving only one-third the amount of coal required by its industries, and Norway is receiving approximately one-half. The situation is no better in the case of the other chief European and South American buyers in the international market.

ALBANY, N. Y.—Following is a complete list of the housing laws passed at the recent special session of the New York Legislature:

1. Amending the summary proceedings act to apply to a city of first class. Any building in course of construction, or which shall be commenced from now until November 1, 1922, is not affected. Its provisions are to be liberally construed.

2. A law applying to Yonkers only. Civil actions for the recovery of rent or of summary proceedings are to be taken out of the hands of the justices of the peace in second-class cities which adjoin cities of 1,000,000 or more population.

3. Exempting from local taxation for a period of ten years dwellings begun before April 1, 1922, and completed in

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Reduces initial steam, water, air, or oil pressures of as high as 200 lbs. to any desired delivery pressure. Used in heating systems everywhere with great success. This is only one of the many Davis Steam Savers.
Install Davis Specialties on your heating system and get reliability of service and save steam—which means saving coal.
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For Steam, Gas, Oil or Air
Notice the Union Bonnet Connection
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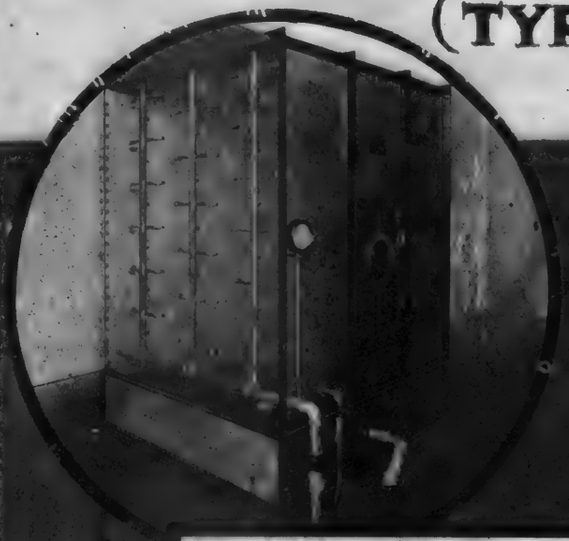
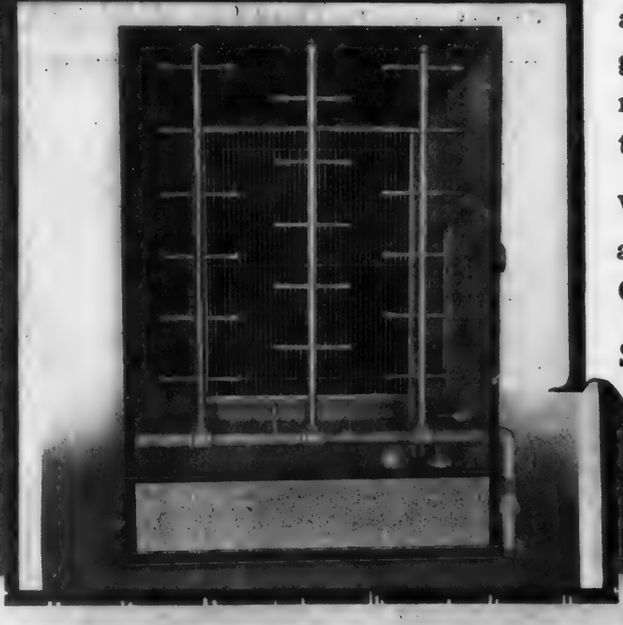
AIR WASHERS
(TYPE "C")





THE ENGINEER IS KNOWN BY THE EQUIPMENT HE INSTALLS

Long after his services are completed, the SPRACO AIR WASHER, through its continuous and efficient operation, testifies to the good judgment of the man who recommended the installation.

Write for full details and information on type C Air Washer.

Spray Engineering Company
Boston, Mass.

THE·CENTER·JET·NOZZLE
Highest Efficiency by Test

two years. Cities have local option on this law.

4. Giving tenants the right, where dispossess proceedings are started for a default in rent, to set up the defense that the rent is unjust and unreasonable. This law requires the landlord or owner, on the commencement of the tenant's defense, to file in court a verified bill of particulars in relation to the building and the income it earns. The law does not apply to a hotel having 125 rooms or more, or to a lodging or rooming house hired for a week or less.

5. A comparison bill enacted to protect landlords in dispossess proceedings, where a tenant raises the question of unfairness of rent, will compel the tenant to deposit with the court an amount equal to the amount paid as rent during the preceding month.

6. Makes agent, manager, superintendent, or janitor responsible to supply heat, light, power, hot and cold water, elevator service, telephone service, or any other provisions in the lease. If said responsible parties fail to comply they are liable to punishment. It takes effect immediately.

7. Extending the time from three to five to from five to ten days in which precepts must be returnable in summary proceedings.

8. Permitting summary proceeding actions to be presented to the Supreme Court and Appellate Division to grant stay in non-payment and hold-over cases of tenants. This was heretofore limited to municipal courts.

9. Giving the courts the power to vacate the warrant in tenant default.

10. Permitting the State and municipalities to invest sinking funds in State Land Bank bonds.

11. Amending the New York City charter so as to permit the erection of new school buildings. This will entail the issuance of bonds, which, without the law, would be in excess of the appropriation set aside for this purpose.

RESEARCH SERVICE BUREAU, 25 West 42d St., New York, announces that it is prepared to make specialized researches in various branches, such as chemical, technical, engineering and construction and manufacturing. The bureau is also prepared to make translations and to furnish photostat copies of articles.

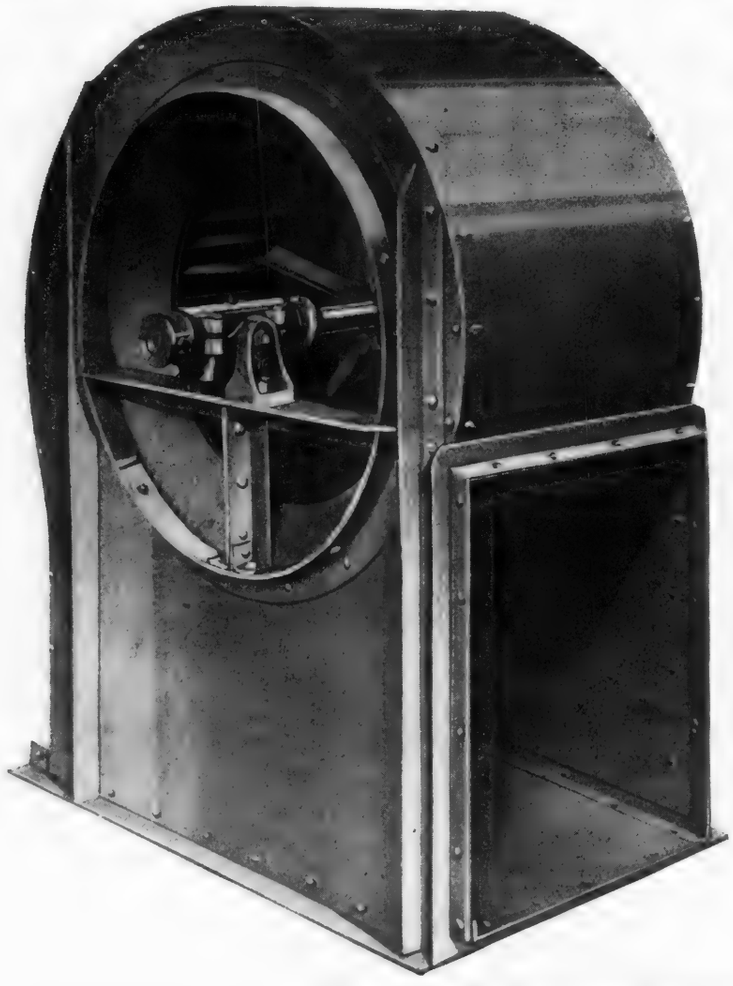
FORD, BACON & DAVIS, Engineers, 115 Broadway, New York, have published a booklet dealing with their services. The firm is prepared to make technical and commercial investigations, to conduct designing and planning operations, and construction; to make valuations and reports, to supervise purchasing, inspecting and forwarding; and to undertake operation and management; also financing and developing.

DES MOINES, IA.—A plan for educating the journeymen steam fitters and plumbers is being tried out in Des Moines, in the form of a series of talks on heating and ventilation given by Royal H. Holbrook, of the Department of Engineering Extension of Iowa State College. The talks are given to the local unions of steam fitters and plumbers on Thursday and Friday evenings of each week at one of the local school buildings. The plan also involves visits to buildings where heating and plumbing systems are being installed to study the practical applications of the principles outlined in the talks.

MINNEAPOLIS, MINN.—One room of the Whitney School, in Minneapolis, is being used to test a new system of ventilation, known as the Fairfield system. With this system, which has already been used to some extent in New York, the incoming air is deflected upward by a window shield after passing over the radiator, and, properly warmed, passes through the "breathing zone" of the children and out through a duct in the ceiling, thus reversing a method in common use.

CHICAGO, ILL.—What will be known as the first international health and sanitation exposition will be held in Chicago, November 24-29 at the Coliseum and Annex. Ventilation will be given special consideration at the exhibit. The supervising committee on health exhibits is composed of Dr. G. Koehler, assistant commissioner of health; Dr. E. Vernon Hill, acting chief of the sanitary bureau; J. P. Kilcourse, chief food inspector; and Dr. Grace Wightman, of the Municipal Tuberculosis Sanitarium.

CHICAGO, ILL.—The first cold blasts of Fall brought some 93 complaints to Chicago's health commissioner from tenants



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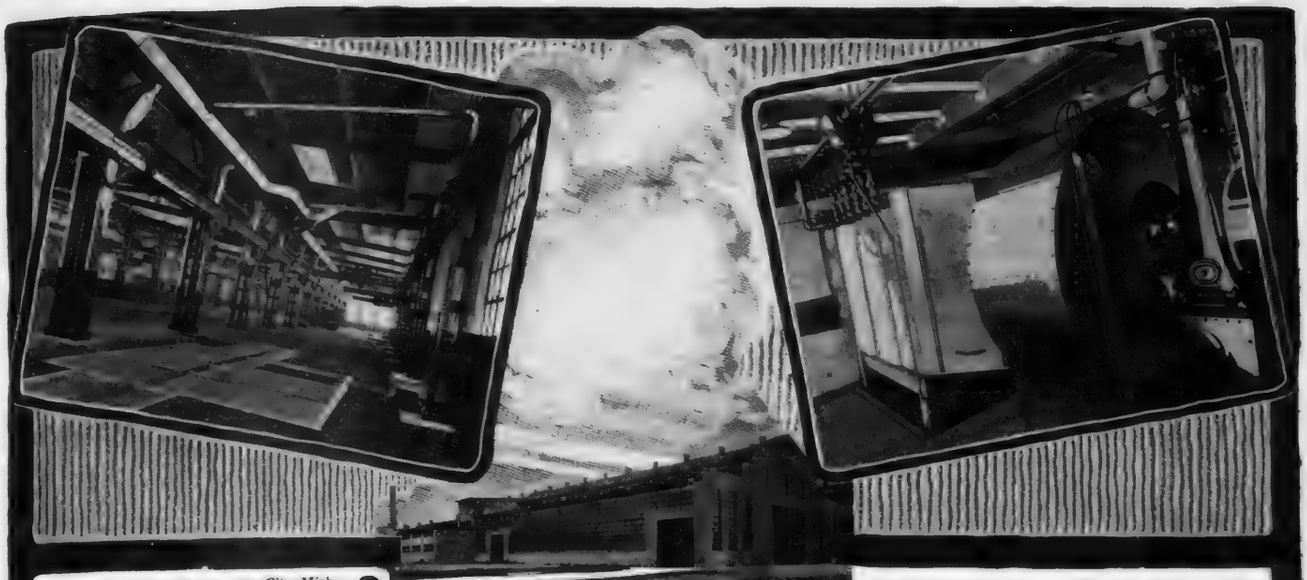
Branch Offices in all large cities

Please mention THE HEATING AND VENTILATING MAGAZINE *when you write.*



Interior Industrial Works, Bay City, Mich., showing special arrangement of heating ducts.

Sirocco equipment in use at Industrial Works.

"Sirocco"

TRADE MARK

Heating and Ventilating the Industrial Plant

The importance of heating and ventilating the industrial plant is recognized today to a greater extent than ever before.

The Industrial Works Company plant, Bay City, Michigan, is one of America's model plants. The view at the upper left shows the special arrangement of heating ducts. The upper right view shows SIROCCO Equipment which makes possible the every-day, all around satisfactory heating and ventilating service of which the plant boasts.

Whether it is for industrial plant or public building there is a type of SIROCCO Equipment to fit the need.

Would you be interested in our new book "A B C Equipment for Shops"? A copy will be sent on request.

AMERICAN BLOWER COMPANY

Detroit **Michigan**

of apartment and other buildings on the ground of insufficient heat. The cold snap hastened action on the proposed minimum heat ordinance which is now under consideration in that city. The draft of the ordinance has been submitted to Leon Hornstein, assistant corporation counsel, who gives the following opinion as to its legality:

"The regulation of the class of buildings known as tenements, which includes all apartment buildings, is well within the police powers of the State. This is on the theory that these buildings are occupied at all hours of the day and night, in time of sickness or health by persons of both sexes, of all ages and conditions, many of whom are helpless and ignorant and unable to assert themselves if their natural or contractual rights are interfered with.

"The physical condition of women and children is now regarded as a matter to be guarded by regulations under the police power. Hence, a reasonable regulation to heat in tenement buildings where the owner agrees to furnish heat, would, in our opinion, be sustained by the courts."

With respect to office buildings or stores Mr. Hornstein, in his opinion, doubts very much whether the police power extends beyond the proper construction and installation of a heating plant.

Regarding factories and workshops Mr. Hornstein says:

"It is probable that an ordinance requiring a certain degree of heat in factories and workshops would be held to be a valid exercise of the police power."

Fines ranging from $35 to $200 are provided for violations of the various provisions of the ordinance, which has the backing of Health Commissioner Robertson.

CENTRAL SUPPLY ASSOCIATION, at its meeting in Chicago, October 20, elected the following officers: President, Alexander B. Pierce, N. O. Nelson Mfg. Co., St. Louis; first vice-president, E. C. Garrity, National Plumbing & Heating Co., Chicago; second vice-president, E. I. Leighton, Leighton Supply Co., Fort Dodge, Ia.; treasurer, E. F. Niedecken, Hoffman & Billings Mfg. Co., Milwaukee, Wis.; secretary, Paul Blatchford, 139 No. Clark St., Chicago. Executive committee: W. E. Clow, Jr., M. M. Cochran, J. D. Tschopic, C. V. Kellogg and J. R. Steneck; national committee: John Walker, Murray W. Sales, C. V. Kellogg, George H. Gorton and A. A. Merkel; delegate to the Chamber of Commerce of the United States, Isadore Weil, Weil Bros., Chicago. In his opening remarks President Pierce alluded to the death of John F. Wolff, president of the Monument Pottery Co., Trenton, N. J., and former president of the L. Wolff Mfg. Co., Chicago. He was the first as well as the sixteenth president of the Central Supply Association. The convention approved and endorsed the advantages of holding, from time to time, joint meetings with the Eastern Supply Association, and referred the matter to the executive committee for action. A talk was scheduled by William J. Woolley, manager of the National Trade Extension Bureau, to be illustrated by stereopticon slides, but owing to an accident to the slides while in the hands of the express company, the talk had to be abandoned.

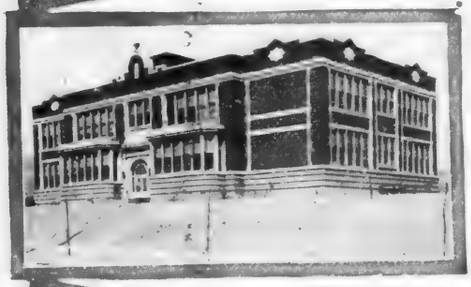
Manufacturers' Notes.

J. L. MOTT IRON WORKS, New York, has established an office and warehouse in Newark, N. J., at 304-306 Jelliff Avenue. Joseph W. O'Loughlin, who has long represented the company in northern New Jersey, is in charge.

NOVELTY STEAM BOILER WORKS CO., Baltimore, Md., has been reorganized with the following officers: President, Oscar S. Jennings; vice-president and general manager, Claude C. Lanman; secretary, Raymond J. Kitchen; treasurer, Harry D. Meacham. Bertram F. Templeton has been appointed general sales manager. Mr. Jennings has been connected with the company since its organization in 1905. Several of the other officers were formerly connected with the Leader Iron Works, Decatur, Ill.

KROESCHELL BROS. CO. and the Kroeschell Bros. Ice Machine Co., Chicago, Ill., have acquired a site on Diversey Boulevard, west of the C. M. & St. P. Railway tracks, 300 x 600 ft., on which they will build a new $500,000 plant. Plans are now in preparation.

Watson School



Unita School

Douglas School

These Salt Lake City Schools

are examples of modern, efficient ventilating and heating methods. They are supplied the year round with pure, fresh air at the required temperature with

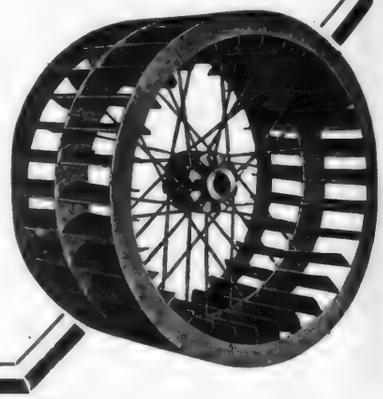
Bayley Plexiform Fans

"There's a Reason"

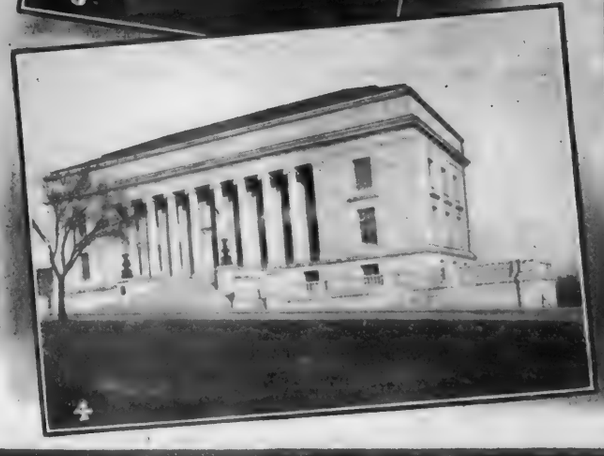
Bayley equipment was chosen because of its sturdy construction, perfect balance, low power requirement, space economy and its ready adaptability to given building conditions and requirements.

Bayley Engineers

are ready to give you the benefit of their experience in designing and installing modern hygienic heating and ventilating equipment, of which they have made a special study. Their services are yours for the asking.



ENGINEERING DEPARTMENT
BAYLEY MFG. CO.
MILWAUKEE, WIS.



St. Paul's Best Buildings are Carrier Equipped

Carrier Air Washers insure an abundance of pure, fresh warm air in winter, or cool air in summer—absolutely free from disease breeding dust, and containing just the right amount of moisture.

These conditions are at all times under perfect control, insuring health, comfort and greater efficiency.

Write Dept. 36 for catalog and engineering data.

Carrier Air Conditioning Co. of America

Buffalo N. Y.

1. Athletic Club, St. Paul, A. H. Stern, Architect.
2. Public Library, St Paul, Electus D. Litchfield, Architect.
3. St. Paul Cathedral, E. L. Masqueray, Architect.
4. Minnesota State Historical Bldg., St. Paul, Clarence H. Johnson, Architect.

Buffalo

WILLIAMSON HEATER CORPORATION, Cincinnati, O., manufacturers of boilers and furnaces, has increased its capital stock from $400,000 to $1,000,000. The company is planning to double its output and is building an addition for this purpose to its foundry in the Oakley section.

WARREN WEBSTER & Co., Camden, N. J., announces the establishment of a branch office in Baltimore, Md., at 15 East Fayette Street. Louis G. Vance has been appointed Baltimore district manager.

FARNSWORTH Co., Conshocken, Pa., held the first annual meeting of its district representatives, salesmen, office and shop employees, at the company's plant in Conshocken, recently. It was a three-day convention. In opening the meeting President F. C. Farnsworth announced a bonus plan for the sales force, based on the amount of sales for each month or for every three months. He also proposed a class in elementary steam engineering for the shop men. George S. Barker, general manager, outlined the policy of the company, placing particular stress on the sales policy and card report system, which is in vogue. Mr. Rose, manager of the Canadian Farsnworth Co., Toronto, spoke on the Canadian shop. Other Speakers were Frank H. Cole, Boston; J. R. Lewis, who told of conditions in steam plants in the Middle West; and W. R. F. Whelan, of Glens Falls, N. Y., who discussed the importance of the Farnsworth forced steam circulation system in the paper mill. The advertising campaigns and policy of the company in the matter of publicity were discussed by George Hofstetter, Jr., advertising manager. E. G. Farnsworth represented the California territory and told of his experiences in selling Farnsworth systems along the Pacific coast. He was followed by Horace D. Jones, formerly of the home office and now assistant to Mr. Rose of the Canadian factory. Another interesting talk was given by Howard Shortt, chief engineer, on details of manufacture, and this subject was also discussed by Frank Shortt. On the final day of the convention the party was entertained at luncheon at Mr. Farnsworth's country home where a programme of sports was carried out. After the sports Mr. Farnsworth addressed the gathering on "Co-Operation."

Central Station Heating Notes.

BELVIDERE, ILL.—Final steps in the organization of the Belvidere Heating Company have been taken by the filing of an application with the State public utilities commission for permission to operate a heating utility in Belvidere.

MONMOUTH, ILL.—The State public utilities commission has denied the application of the Monmouth Public Service Company to increase its heating rates according to the schedule on file, and has placed a new schedule in effect. It fixes the rate for the first 20,000 lbs. of condensation at $1.10; the next 20,000 lbs. at $1.05; the next 20,000 lbs. at $1.00; the next 40,000 lbs. at 90 cents; and all over 100,000 lbs. at 85 cents. The minimum charge for service is $23.00 monthly. Ten per cent discount is allowed for prompt payment.

ROCK RAPIDS, IA.—Acting on a report drawn up by W. J. Purchas, as chairman of a heat committee of the city council, the city council has raised the price of city heat from 70 cents to $1.10 per 1,000 lbs. condensation. This action has aroused considerable comment on the part of users who are recommending that a heating expert be employed to analyze the report. Some of the figures will be found of general interest. It is stated, for instance, that at the time the plant was established, in 1916, the rates were fixed at 50 cents per 1,000 lbs. for certificate holders and 60 cents per 1,000 lbs. for cash customers, with an allowance of 6% interest to customers who bought certificates. Since 1916 there has been one increase in the heating rates, namely in October, 1919, when the rates were advanced to 60 cents for certificate holders and 70 cents for cash customers. The average cost of coal in 1916 was $3.49 per ton. In 1917 the average cost of coal was $4.50 per ton, an increase of 28.6%. In 1918 the average cost of coal was $6.13 per ton, an increase of 76%, while in 1919 it rose to $6.46 per ton, an increase of 85%. If the 50-60 cent rates were right in 1916, it is argued, based on $3.49 coal, the 85% increase in 1919 would

INSTALLED AS AN ELBOW
IN THE RUN OF THE DUCT

The cut below shows a portable bake-oven, from which the smoke and heated air are being carried off by a

WING-SCRUPLEX EXHAUSTER
REG. U.S. PAT. OFF.

Its compactness is indicated by the fact that it is installed just like an elbow in the run of the duct, and is, therefore, very economical of space. The motor, also, is entirely outside the duct and does not come in contact with the heat and vapors being expelled. It is always clean and cool and is easily accessible.

In this bakery the Wing Scruplex exhauster is removing the heated air and smoke from the oven, and at the same time providing constant ventilation.

The wonderful adaptability of the Wing Scruplex Exhauster to almost any condition has led many engineers, architects and plant superintendents to specify it in their plans for new and remodeled construction.

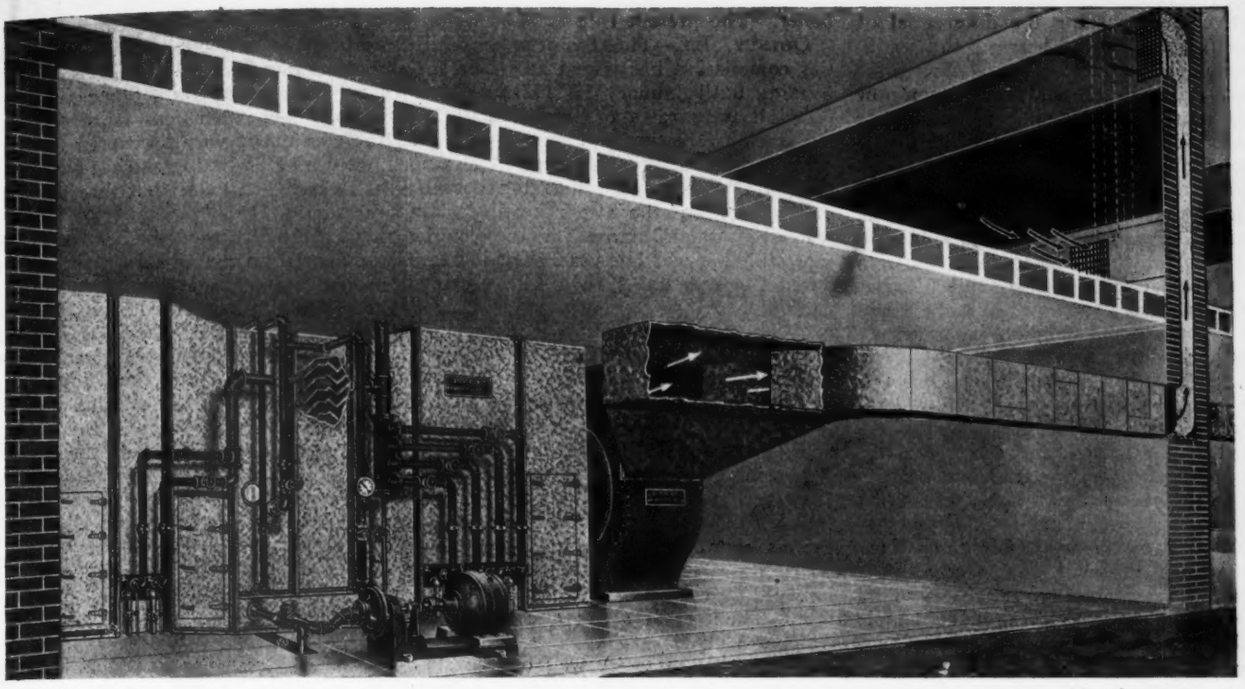
This illustration, and others that will follow, will show how well the WING SCRUPLEX EXHAUSTER is adapted to almost any set of conditions.

The Wing engineers will be glad to advise with you concerning the proper selection of Wing Scruplex equipment for your requirements as they arise. This service is yours without cost.

Bulletin 58-A explains how the WING SCRUPLEX EXHAUSTER is doing the work in many plants throughout the country.

Send for your copy today

L. J. Wing Mfg. Co.
Fans and Blowers (all types) Damper Regulators
Hudson and 13th Streets New York City



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HEATING AND VENTILATING APPARATUS

Standard for Factories; Railway Buildings; Federal, State, County and Municipal Buildings; School Buildings, and Banks; Offices; Theatres; Mercantile Buildings; Hotels; Clubs, and Churches.

State your need. We have a catalogue to meet it.

B. F. STURTEVANT CO.

Hyde Park, Boston, Mass.

and all principal cities

bring the rates to 93 cents and $1.11, respectively. Regarding the differential of 10 cents per 1,000 lbs. between the certificate holders and the cash customers, the report states that a flat rate from now on is more equitable, but the certificate holders should still be credited with 6% interest until their certificates are used.

VIRGINIA, MINN.—Approval of the work of the water and light department, in installing and operating the municipal heating plant in Virginia, is given in a report of A. B. Holley and Charles Foster, engineers employed to make a survey. One recommendation contained in the report is for the installation of either steam separators or dift pockets in buildings where there is any trouble with gathering water. The report was accepted by the council and a copy will be sent to the heating system appraisers to help in the preparation of the assessment list.

WASHINGTON, O.—Washington Court House residents will pay nearly 100% more for water heating service beginning October 15, according to the new schedule of the Washington Gas & Electric Company which has been filed with the State public utilities commission. The new rates, however, have not yet been approved by the commission. According to the schedule as filed, a rate of 45 cents per square foot of radiation will be charged for an indoor temperature of 70° F., as compared with the present rate of 23 cents. A rate of $30.00 is asked for a heating season permitting hot water to flow through a coil in a 40-gal. range boiler. The present rate is $15.00.

QUINCY, ILL.—The State public utilities commission has issued an order suspending until January 25, 1921, the proposed heating rates of the Quincy Gas, Electric & Heating Company. It was brought out in the hearings regarding this proposed increase that the cost of coal to operate the steam heating plant would be $12,000 more for the coming season than it was last year. The increase asked for was 33⅓% over the previous rates.

CARROLLTON, ILL.—Proposed increased rates for heating in Carrollton of the Central Illinois Public Service Company of Mattoon were suspended until January 30, 1921, by the State public utilities commission, pending further hearings.

MORRISONVILLE, ILL.—The Southern Illinois Light & Power Company of Hillsboro has been authorized by the State public utilities commission to increase its rates for steam heating service in Morrisonville, as asked for in its petition. The increases are effective as of October 1, 1920.

SPRINGFIELD, ILL.—A wag on the staff of the *Springfield (Ill.) Register* gives the following account of the circumstances that deprived the Springfield Chamber of Commerce of heat on the occasion of the recent cold spell in that section:

"With chattering teeth and red noses, the office force of the Chamber of Commerce, wearing extra wraps and uncheerful countenances, is trying to make the best of a situation arising from a comedy of errors. When the connections for heating the new building were made last summer they were left open so that the heat was turned on. Some weeks ago when the weather was much too warm for comfort it was discovered the radiators were all working and the temperature had reached a point that threatened suffocation.

"Somebody turned the heat off. When the men from the Utilities company came around at the usual time to turn on the heat for the winter it being impossible to turn it on and it being their turn to turn they turned it off instead, at least that is the way the victims 'doped' it out this morning when they found the radiators stone cold.

"By the time they made the discovery it was too late to secure the services of the turners on and so they are just waiting for something to turn up."

New Incorporations.

TIDEY HEAT REGULATING SECURITIES CO., Newark, N. J., has been organized to manufacture heat-controlling devices and equipment. Offices have been opened at 256 Market Street. Among the principals are Samuel E. Tidey, 232 Central Ave., Orange, N. J.; and G. W. Oprits, 111 Maplewood Ave., Maplewood, N. J.

EASTERN FUEL CO., Pittsburgh, Pa.,

Buckeye Multiblade Fans

are made especially for low pressure Heating and Ventilating work. They are giving perfect satisfaction.

CORRECT DESIGN. HEAVY CONSTRUCTION, NOISELESS OPERATION, WORKMANLIKE FINISH, HIGHEST EFFICIENCY.

Our Engineering Department is maintained for the purpose of assisting Engineers, Architects, etc., in planning efficient Heating and Ventilating Systems for all buildings.

THIS DEPARTMENT IS FREE TO YOU.

We also manufacture a complete line of Disc, Cone and Steel Plate Fans.

Write Department D

BUCKEYE BLOWER CO.

COLUMBUS OHIO.

Municipal Building, New York
McKim, Mead & White, Architects
Equipped with 17 Massachusetts Fans

MASSACHUSETTS FANS

THE selection of Massachusetts Fans for this tremendous office building, housing thousands of workers and demanding the utmost efficiency in ventilation, is another striking example of the esteem in which experienced architects hold this equipment.

Seventeen Massachusetts Fans are installed in the Municipal Building, including:

10 Multi-blade or Squirrel Cage Fans driven by 204 h. p. and moving 276,000 cubic feet per minute.

6 Propeller Fans driven by 46 h. p. and moving 164,000 cubic feet per minute.

1 Centrifugal Steel Plated Fan driven by 10 by 12 engine.

Total Pressure 162,000 cubic feet per minute.

Total amount exhausted 278,000 cubic feet per minute.

All over the country are to be found other notable buildings equipped with Massachusetts Fans.

May we send you a list of leading installations and a copy of our Condensed Bulletin of Fans, Blowers and Heaters?

MASSACHUSETTS BLOWER COMPANY

Watertown, Mass.

Branches in All the Principal Cities

capital $500,000, has been organized to act as eastern and export subsidiary of the Reilly-Peabody Fuel Co. President, Eugene S. Reilly; vice-president and secretary, Lawrence A. Quinlivan; treasurer, Frank T. Peabody. The general offices of the new company are located in the Frick Building, Pittsburgh, and a new York office has been opened at 30 Broadway.

WESTERN ENGINEERING CO., Davenport, Ia., capital $50,000, to manufacture and install heating, plumbing, steam and water equipment. President, D. C. Murphy; vice-president, Jeremiah J. Ryan; secretary aand treasurer, Jean Murphy.

SIMMONS PLUMBING & HEATING CO., Wichita, Kan., capital $75,000.

OKLAHOMA PLUMBING & HEATING CO., Enid, Okla., capital $25,000. Incorporators: J. F. Sayward, Lee Dennis and R. F. Spaeth.

WANTED

Advertisements under this heading, $2.00 per inch, payable in advance. A 1-in. advertisements contains 35 words. To secure insertion copy must be received not later than the 20th of the month preceding date of issue.

Plumbing Instructor Wanted.—Man capable of teaching practical plumbing and heating. Also advanced theory in sanitation, heating and ventilation. A good opportunity awaits the man who can qualify. Apply State Trade School, Stamford, Conn.

For Sale—Complete equipment for power plant installation, including boilers, stack, generator, heaters, pumps, switchboards, etc. This apparatus is in A-No. 1 condition and ready for immediate shipment. Price is right. Address Economy Co., 575 National Ave., Milwaukee, Wis.

Wanted — High-grade heating and ventilating engineer, who has had experience with both large and small work, especially schools, institutional buildings, office buildings, etc., Address Charles L. Pillsbury Co., 805-811 Metropolitan Life Building, Minneapolis, Minn.

CUT THE HIGH COST OF FUEL

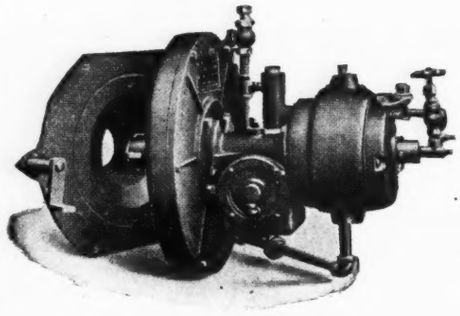
USE THE

Ray Rotary Crude Oil Burners

FOR STEAM AND HOT WATER BOILERS

Adapted to Any Type of Boiler or Furnace

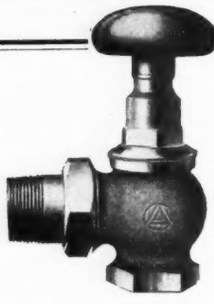
High or Low Pressure, 10 to 300 H. P.



Write for Circular H

W. S. RAY MFG. CO., 29 Spear St., San Francisco, Cal.

Manufacturers of Ray Crude Oil Burners, Ray Heavy Steel Oil, Gas, Coal or Wood Ranges



"Genuine Detroit" Packless Radiator Valves

Detroit Packless Radiator Valves are the result of years of experience in the valve manufacturing field—of a careful study of valve needs—of painstaking care on the part of our engineers.

So well do these valves qualify for efficient service—for handsome design and pleasing appearance—for complete satisfaction, that leading architects, heating engineers and master builders, the country over, recommend and specify them for jobs that require the most careful consideration.

They are made for steam, vapor and vacuum heating systems—in all necessary sizes and a variety of styles. Let us send booklet giving full information.

DETROIT LUBRICATOR COMPANY.

DETROIT, U.S.A.

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RE-ENFORCED PACKLESS

VALVES

Quick Opening

Note General Lines Carefully

The **ONLY Packless** and **Modulated** Valves in which the **Packless Feature,** although a **positive seal within itself** and **practically indestructible,** is, through a packing cushion and a very heavy special spring, **automatically re-enforced,** providing **two or double, independent, positive,** bonnet seals at **all times.**

These valves will withstand high pressures and, therefore, are of **superior value** for **vacuum** and **low pressure service.**

We specialize on high grade Radiator Valves and furnish the largest line of any company in the business

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